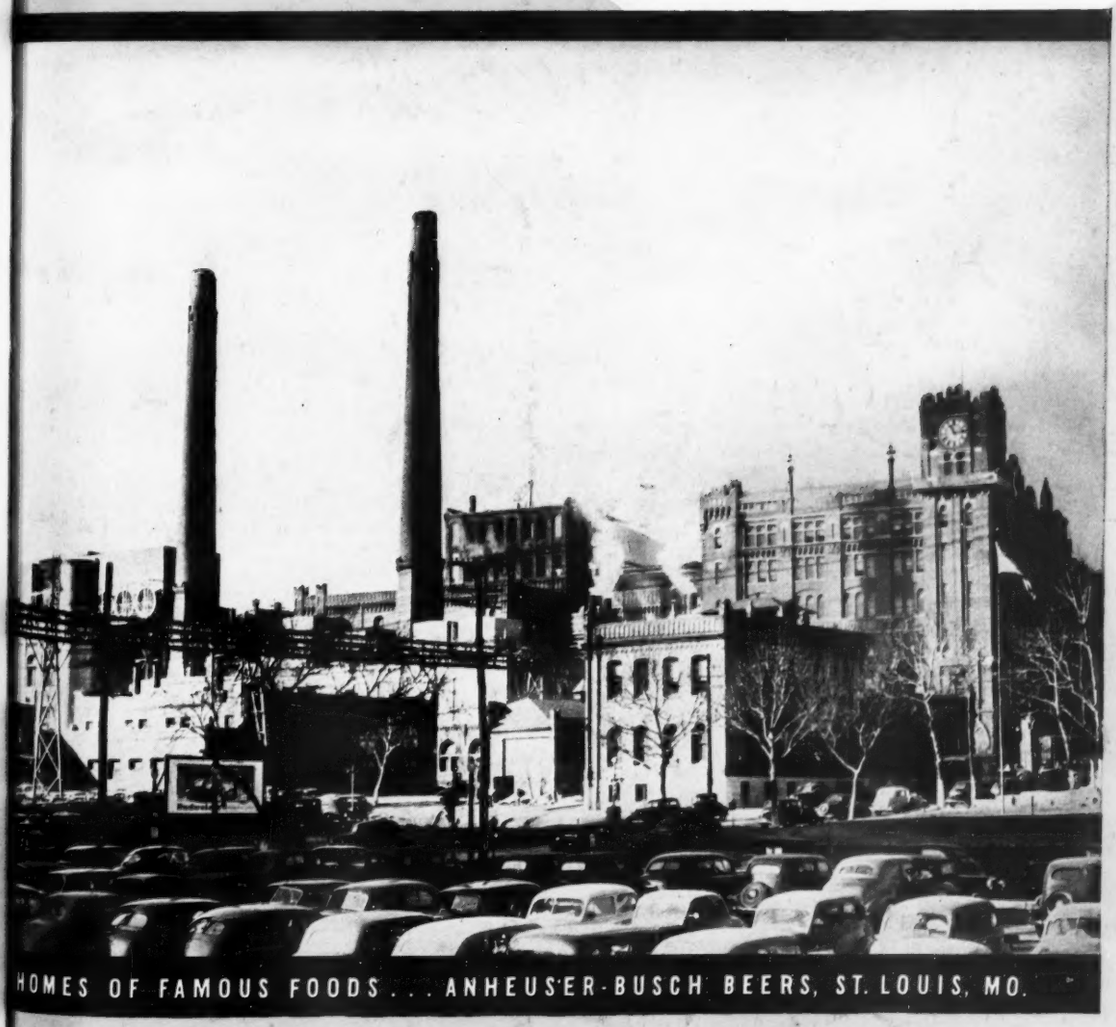
FEBRUARY 1940

FOOD INDUSTRIES



HOMES OF FAMOUS FOODS . . . ANHEUSER-BUSCH BEERS, ST. LOUIS, MO.

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High Temperature Pasteurization Flow Sheet

Britain's Food Supply in War Time

Quick Freezing Installation at Dulany's

Competition Between Edible Fats and Oils

Quality Control at Anheuser-Busch, Inc.

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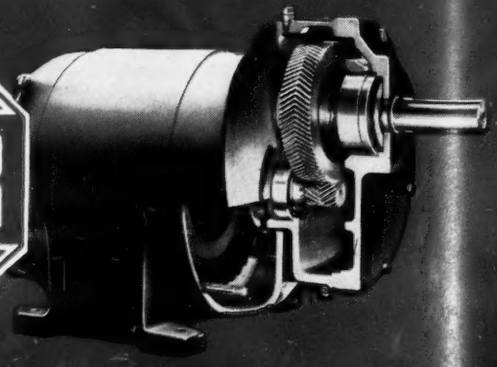

FOOD INDUSTRIES

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★HOMES OF FAMOUS FOODS

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In THIS *Issue*

• FOOD FOR FIGHTERS

What are the prospects for selling foods to Great Britain and France during the current European war? Will demand for foods put a burden on U. S. producers, as it did during the World War? These are questions in the minds of many American food manufacturers today.

In partial answer to these questions, at least in so far as Great Britain is concerned, FOOD INDUSTRIES offers the article beginning on page 43 of this issue. It's author, Dr. H. B. Cronshaw, has edited food publications in England for many years, being at present the editor of *Dairy Industries.* He speaks with authority of Great Britain's plans to keep up an ample food supply in spite of the difficulties facing food imports.

• TO ATTRACT FAIR VISITORS

Last month, FOOD INDUSTRIES told of the experiences of food manufacturers who exhibited at the New York World's Fair 1939. It was shown, by facts and figures, that some of the exhibits achieved outstanding successes, while others were only so-so, or worse.

There was a reason. And, in an article beginning on page 55 of this issue, the various exhibits are analyzed and the reasons are brought out. No manufacturer should miss this guide to successful showmanship.

• A BATTLE ROYAL

Remember the old-time "battle royal," where twenty or so "palookas" entered the ring at once and slugged miscellaneously until only the victor was left standing on his feet? Well, something like that has been going on for some time among the various edible oils and fats. What it's all about—the technological, economic and political factors behind the battle—is told in a series of articles by Gordon McBride, the first of which commences on page 60 of this issue.

• GENIUS AND BEER

Someone once said that genius consisted of an infinite capacity for taking pains. If that is true, then Anheuser-Busch beer and its famous quality are the products of genius. Quality control methods at the Anheuser-Busch brewery in St. Louis begin with barley seed selection for farmers and carry right through to the customer's first sip. The story commences on page 39. The methods recounted will suggest similar prestige-building routines to all food manufacturers.

• ROAD MAP FOR PASTEURIZERS

We promised readers of FOOD INDUSTRIES that we would publish some new food industry flow sheets during 1940. The first of these will be found on page 48 of this issue. It shows the flow of milk in a short-time high-temperature pasteurization plant.

In FORTHCOMING *Issues*

• YOUR SHOW WINDOW

Most food manufacturers have little or no opportunity to meet the ultimate consumers of their products face to face. That job must be done for them by the package in which the product is sold. This package is the food manufacturer's show window, often creating a first impression that can never afterward be changed.

When so much depends on the package, no one in the food business can afford to miss anything that will help to make for better, more effective packaging. That is why we hope that all our readers who can possibly make it, will attend the packaging conferences at the Hotel Astor in New York from March 26 to 29. And it is also why FOOD INDUSTRIES for March will present a group of articles covering some of the important technical aspects of packaging.

• QUALITY CONTROL—AGAIN

FOOD INDUSTRIES warned its readers that the series of articles on quality control, begun almost three years ago, would be continued in 1940. You will recall that last month quality control methods for beef, salmon, flour, and ice cream were discussed. This month, bread and beer quality are discussed. The series continues in March with an article on quality control in butter manufacture.

• IS SUGAR SUGAR?

If you attended some of the standards hearings held in Washington last year, you may well have asked yourself what is really meant by the word "sugar." So much discussion was brought out on that subject and so much uncertainty was apparent in most minds as to the relative utility of sucrose, dextrose, liquid sugar and other sweetening agents, that FOOD INDUSTRIES has already published one informative article on the subject ("Choosing Sweetening Agents in Food Manufacture," November, 1939, Food Industries). To round out the subject, two more articles on various aspects of the sugar situation are now in preparation.

• ANOTHER STANDARD

One more in FOOD INDUSTRIES' series of standards for grades of food products, with color, as determined by the Agricultural Marketing Service, will appear in March. The product this time will be canned asparagus.

FOOD INDUSTRIES

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LAURENCE V. BURTON, Editor

Volume 12, Number 2 February 1940

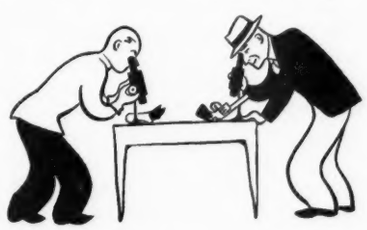
The Talk of the Industry

» THE NEWLY FORMED Institute of Food Technologists is growing rapidly. Unofficial dope has it that the IFT now has better than 500 members, all of whom are presumably Charter Members.

Membership in the organization involves, however, more than merely paying one's dues. Applications are considered carefully, and sometimes personal calls are necessary before action can be taken. And such procedure requires considerable time.

Chicago has an active local section. It seems likely that other cities will also see the formation of local groups.

» TO ROY C. NEWTON of Swift & Co. goes the distinction of figuring in the "Dick Tracy" serial strips that are running currently in newspapers. In November, pictured as Doc. Newton of the Rapid Packing Co., he assisted detective Dick Tracy in



identifying a substance found on a revolver as a sinew from a pig's foot.

Such fame, even though it be in fiction, carries a cost, for Swift & Co. was besieged with phone calls and telegrams from everywhere. Yet there were offsetting compensations. Even though the prices of all meats declined soon afterward, the price of pigs feet went up slightly.

There ought to be a moral there for sales promotion departments.

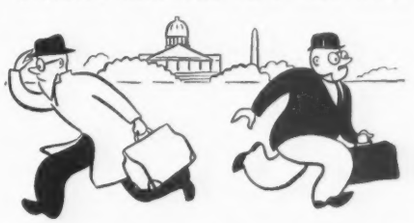
» THE SCARCITY of persons from food manufacturing industries at the recent meeting of the Society of American Bacteriologists at New Haven, Conn., is nothing short of astonishing. One large company, the executives of which have often ribbed us for not teaching more elementary bacteriology in these pages, was entirely without representation. This, despite the fact that the concern employs several bacteriologists.

Admittedly, the amount of information one picks up sitting on infernally uncomfortable chairs in a scientific meeting is not always worth the expense of the trip. But, in our own case, the ideas picked up over a bowl of clam chowder at Wilson's with five of the world's leading industrial bacteriologists were well worth the time and the money.

Executives who sit on expense accounts should be made aware that these off-the-record "bull" sessions are usually ample justification for sending scientifically trained workers to attend scientific meetings.

» THINGS are not always what they seem, and to form a judgment on superficial observation is often hazardous. For instance, the recent exodus of research personnel from Washington to the four Regional Laboratories of the U. S. Department of Agriculture even though the laboratories are not yet complete.

As it is explained to us, this apparently undignified haste to get away from Washington has no political significance but is solely due to the stringent regulations of the government's comptrollers office. The rule is laid down that money appropriated by Congress for field work may not be spent in Washington. And so, the U.S.D.A. men who have been hired



were required to hot-foot it to the country even though their initial activities in planning research projects could probably be better carried out in Washington than in other places.

» WHICH CALLS to mind the very common error made by business men who have anything to do with research before they are thoroughly familiar with its methods and management. Good research, which is but another name for inventing done to order, requires an immense amount of careful planning at the outset. Months spent in proper planning will often save many months or years of costly experimental work.

Furthermore, it is always sound business to give the research man time

to find out if somebody else has already published the answers to the problem. Demand for immediate results often causes a researcher to commence experiments prematurely.

» A RECENT ARRIVAL in Washington brought this tale from Finland. A very old man, a trapper, who lived alone in the wilderness of the far north, made a hundred mile trip on skis just to ask the Finnish police this one question:

"Tell me," he demanded, "Is it really true that I can now kill a Russian without going to jail?"

» OUR remarks about female sex hormones last September were picked up and widely circulated by periodicals that cater to the goofy trade. This, in turn, brought down on us a deluge of requests for "complete information" or "all available information" about sex hormones. Every request was from a man—or, at least, the signatures were men's names. Possibly they had homely daughters who were to be beautified by judicious administration of female sex hormones.

Editors of digest periodicals are hereby warned to take care of the goofy trade themselves.

Train Loads Lower Freight Rates

COMPETITION of water carriers made very difficult for the railroads the getting of any business in the hauling of molasses from Louisiana to Illinois. The barge lines on the Mississippi River were getting the lion's share of this transport activity. As a result the Interstate Commerce Commission has granted certain railroads permission to make a new type of freight rate on train-load quantities of blackstrap molasses.

There are not many divisions of the food business that can use train-load lots of raw materials. But those which can may find it important to investigate the possibility of getting such low rates for their goods. They should not expect to have I.C.C. approval on train-load rates generally. But if there is threat of water competition or other compelling reason, they now have a precedent-making decision to support requests of this sort.

And the change in rates from the single carload to the train-load lot may be quite important. In the molasses case referred to the single car rate is 17.5 cents and the train-load rate 15 cents per 100 lb. for this particular haul.

Every important purchaser or shipper of goods where there is any comparable condition should study his case to determine whether he too may not go along on this system of lower freight cost.

Budget Increase for F. D. & C. Administration

THOSE scandalously long hearings on standards of identity under the new Food, Drug and Cosmetic Law, plus the cost of thousands of pages of testimony at 10 cents per page for every food, have been reflected in the President's budget message to Congress. Whether the entire requested $200,000 increase will all be earmarked for standards hearings is not known, but unless procedure is simplified and expedited by common sense preliminary conferences the high cost of the hearings will continue.

The budget asks for $2,959,658 which compares with $2,741,138 for the current fiscal period.

We would like to know what the needless cost of hearings will be to the food industry. Take the Battle of Sugar, which is not over yet—not by a whole lot. What will be its ultimate monetary cost? It seems unlikely that the makers of sucrose, dextrose, sirups, etc., will get out for less than a quarter of a million dollars to defend their respective viewpoints.

Of course, no right thinking person would advocate curtailing the F. D. & C. A. budget to compel a more sane approach to standards-making than

Hors d'Oeuvres

• To the Finns the beverage bottle has a very special reuse value. They fill the empty bottle half full of gasoline, attach a stick like a fuse, light the stick and hurl the bottle at a Russian tank. Blazing gasoline splashes over and inside the tank, often rendering it *hors de combat.* Some Finn, eh?

• *Headline: "Three Million Coin Machines in Use for Selling Nuts." For selling nuts what?*

• Reindeer milk is the richest of eleven different kinds of milk listed in the 1939 Yearbook of Agriculture. It has 22 per cent of butterfat. Who called that cream milk?

• *Now and then we like to disseminate a morsel of information vital to the peace of mind and happiness of mankind. This time it's an answer to which-is-it? "corned beef" or "corn beef." Well, it might be either or both. Definite, what? Beef fed on corn might be, but never is, called corn beef. Beef pickled or cured is called corned beef. And pickled corn-fed beef might be called corned corn beef, but isn't. Any questions?*

• How long a train of tank cars would the annual supply of milk in the United States fill? We wouldn't know either, but Milk Industry Foundation says one nearly 17,000 miles long. Now that you have the matter cleared up, we trust you'll sleep better tonight.

• *WPA researchers report an itemized court bill of the 17th century for New York. Of 26 pounds 11 shillings spent to convict and hang a woman accused of infanticide, more than half was spent on such instruments of justice as French wines, brandies and beers for the jurymen, executioner, carpenters, and porters and the five Indians who tracked down the woman after she broke jail.*

• Sixteen years ago a junior at Stanford University bought an orange squeezer and a few crocks. Before sunrise and after dusk each day he made orange juice and offered it for sale to fraternities, restaurants and hotels. In two months his business grew so much that he left school to establish a plant. This year his factory will squeeze 144,200,000 oranges. The student's name was Frank W. Bireley.

• *"Where can you get $40 a week when you graduate? Where can you get into any business that is making more money? Where can you get a chance for an executive position any sooner? So asks Dr. Paul W. Ivey, University of Southern California, when advising students to take jobs as truck drivers in the carbonated beverage industry. Well, where can you?*

• The "corn dog" and the "corn hog" are two new food creations of the ole S'uth'n school of cookin'. Down in Dallas these have become the conv'sation of the tawn. The cawn dawg is a skinless frankfurter baked in the center of a cornbread roll. The cawn hawg is likewise, 'ceptin it contains pork sausage instead of a frank.

• *You are what you eat, says Dr. Victor G. Heiser. Which sounds all right until you go back a couple of steps in your food supply. For instance, you eat pork, and what a porker doesn't eat—well, you name it. But maybe the doctor is right.*

• Acme Packing Co., Boston, announces Aunt Abby's Fish Food for Cats.

• *From 1935 to 1937 there was an increase of over 31 per cent in doughnut sales. As increases go, that certainly was a hole lot.*

F. K. L.

has prevailed in the past. But one hazards a wee, slight suspicion that, if Congress should cut down the amount allotted for standards-making, the work would be done with greater directness and economy of time and money for all interested parties, and without in any way detracting from the safeguards which these standards of identity are to create.

More Conference, More Confidence

THE FOOD INDUSTRIES will welcome sincerely a continuing effort of the Food Standards Committee to confer with industry groups in open sessions before they formulate proposed food standards for formal hearings. The announcement that oleomargarine, canned fruit salad, and various types of bread were to be the subjects of open conferences late in January seems to indicate that a system of cooperation is being established.

The more of these conferences there are the better will the federal officials and the industry executives understand each other. Such understanding can lead to prompt and effective work. It will eliminate much bickering and needless controversy from the formal proceedings which must come later.

More such conferences should be held. And at these conferences the industry should deal frankly and fully with the difficult and complicated problems of standards making as influenced by practical manufacture. Let the good work go on.

Choosing Food Fats

FOOD MANUFACTURERS pay out a large part of their expenditure for raw materials in the purchase of fats and oils. Much of this spending is based on very carefully considered technical facts. But far too much of it is based on habit, mere preference, or even prejudice.

This situation makes it very important for every food manufacturer who buys any fats or oils, directly or indirectly, to study the inter-fat competition which is described in an article presented in this issue of FOOD INDUSTRIES. A consideration of the general principles there presented will refresh the memories of all regarding important relationships too often forgotten or neglected when buying.

In later issues, there will be further contributions to this subject. They will deal with the various technical considerations which affect particular parts of the job of the food manufacturer when he goes out to buy this important group of raw materials. They will also bring out those technical considerations regarding the uses of these fats and oils in our own factories.

These latter facts are, of course, those that determine most of all the pound-effectiveness and the dollar-economy with respect to the fat content of manufactured foods. And they are the facts that also determine flavor, texture, consumer acceptance, and many other considerations of great importance in selling the products of food manufacture, and keeping them sold with the general public.

A serious study of these parts of our job of running a factory is recommended.

Better Sanitation Stirs Up Industrial Relations Problems

APPLICATION of practical bacteriology to the handling of perishable foods is undergoing a severe test at the Boston Fish Pier. Well informed fish company executives know that the quality of fish and their keepability depends on keeping bacteria out of the flesh. Subsequent icing and refrigeration do not entirely prevent the action of bacteria. But the workmen themselves resist all efforts to get them to handle fish properly. In this practical matter of fish sanitation the fish handlers of England are far and away ahead of American practice. It is not a matter of public health—merely one of quality control.

If the employees of any dairy company were to resist and obstruct similar efforts to avoid bacterial contamination of milk it is certain that the board of health having jurisdiction would close down the plant and throw the men out on the street.

If it were a brewery, the management would quickly put the fear of God and bacteria into the souls of the workers. And, though meat packing houses have not yet developed the degree of sanitary discipline among workers that makes for quality control to the same extent as the dairies and brewers, any comparable, senseless, contaminations would never be tolerated. Especially if the plant were under inspection of the Bureau of Animal Industry, for the B.A.I. is effective—even ruthless—and has the authority of the U. S. Government back of it.

In Boston the bacterial problem of fish handling is one of long standing. Apparently its aggravated condition exists because a strong union of fish handlers came into being before the fish companies were fully aware of the relation of bacterial contamination to fish quality. All fish have bacteria on their surfaces and, if the fish are handled with pitch forks, the surface bacteria are pushed down into the muscles, or intestines are punctured and infection arises from that source. This infection is not a matter of public health but merely one of needlessly initiating or starting spoilage.

Eastern fish handlers insist on using the three-tined pitch fork. Early in the summer of 1939 the companies, failing to institute the more sanitary practice by acting individually, tried to force it by cencerted action. And failed after one day's trial. (See FOOD INDUSTRIES, **11**, 428, 1939.) Organized labor refused to handle the fish without forks. In England no forks are permitted. It's all done by hand.

This time the Boston Health Department has stepped in. On Jan. 8 a strike was called to object to the use of the one-tined fork (known on the Pacific Coast as a pugh) as an improvement of the triple puncturing device previously used. If the new method is finally adopted it will cut the extent of bacterial infection by nearly two-thirds, with corresponding improvement in quality. But the fish handlers are paid on a piece work basis and claim the one-tined fork actually cuts their wages correspondingly, which could be true only if three fish were lifted with every three-tined fork full.

Health Department officials have persuaded the men to give the new forks a fair trial, but at the time of writing the matter was far from settled.

From the history of the effort to improve bacteriological conditions, it is evident that there is both a human angle and a wage angle to be considered in addition to the purely scientific aspects.

Vitamin C vs. Coffee

SO COFFEE AT SUPPER keeps you awake at night? Therefore you forego its stimulus except on special occasions.

But it doesn't always affect you that way. Sometimes you can drink one, two or even three cups at night and sleep soundly. There must be a reason.

Which calls to mind several casual observations that deserve intensive research. Apparently a person who is well supplied with vitamin C is immune to the prolonged coffee stimulus. On one occasion three cups of strong

coffee at 7 p.m. were followed by synthetic vitamin C (about 500 units) at 9:30 p.m. Then to bed at 10:30 and sound slumber. But, mind you, these are isolated instances and observations —not generalizations.

If research should show that this is a general phenomenon, it will be a boon to the coffee industry, the cream industry, the vitamin food industry—to say nothing of the makers of the pure vitamin C.

Opportunity

SPEAKING of vitamins, investigations now under way by Raymond Young at the University of Maryland indicate that intestinal bacteria often thrive on vitamins, especially vitamin C. Dr. L. H. James informs us that the coliform organisms sometimes destroy this vitamin before the human body can absorb any of it. Which, perhaps, accounts for many obstinate cases of vitamin C deficiency or other ailments that theoretically should respond to treatment with vitamins.

And for the food manufacturer it suggests the need for research into the possible implications of this investigation. It suggests the need of low cost foods that will replace the normal intestinal bacteria with types that will not rob the body's food supply of vitamins. At present the principal food for such replacement is acidophilous "buttermilk" at about 35 cents per quart—which is a bit expensive for most folk. Cheaper foods are needed for this purpose.

A Hint to the Publicity Minded

OCCASIONALLY a food company delegates its publicity function to someone in the advertising department who is ill prepared for the task and erroneously measures his own effectiveness by the number of times he can get his employer's name in print. But there are also times when he ought to measure his worth by the number of times when he can keep his company out of print.

Advertising and publicity are two distinct activities, and seldom does it occur that both are well done by the same department, let alone by the same person. Publicity is one—and only one—of the methods or tools of the public relations function and it is very seldom that an advertising man is the best choice for public relations work.

Your advertising man is accustomed to buying ad. pages and sending the copy to be printed there. If long experience habituates him to that practice, it is likely that he will attempt to repeat it, if he tackles the publicity job. But, without the one indispensable factor, his handouts to the press are destined to the editor's capacious waste basket, even before they are mailed. That indispensable factor is the news "hook" or "angle" on which the publicity story must hang.

No newspaper or magazine ever prints anything without a reason, and the most important reason of all is the story's news value—its newness or novelty. Without this news element, there is little justification for publishing. And very often a company will, for reasons known only to themselves, refuse to give out the information that would make a corking good story until the news has grown so stale that no editor would ever publish it. The news angle simply is no longer there. Too many people know all about it already. And if the unhappy publicity man were then to say, "Either you publish it—or else!" most editors would delight in throwing the handout into the waste basket. For every editor knows that a publicity man who cannot get publicity loses his job—Pronto!

A while back a certain important man decided to change jobs. Months before the change became effective he confided in all his friends, including ourselves. Each was sworn to strict confidence, yet no less than twenty letters from all over the country apprised us of the impending event some three month before it occurred. When he finally went to the new job and we were thereby released from our pledge to secrecy, the news was a quarter of a year old and, to his great annoyance, we just plain forgot to print the story because it was so old. Everybody knew it. He had done his publicity very effectively by mail.

The news angle or hook on which a printed story must always hang has a way of disappearing with the passage of time. When such a hook exists, it is an opportunity that must be grasped at once or it will dry up and disappear. In this fast moving age, a story is alive and hot today, and dead as a dodo tomorrow.

Elementary Public Relations Defects

GOOD PUBLIC RELATIONS, like charity, begins at home. And it begins with small details that are often overlooked, like a reception room, that is cheerless, uncomfortable, even forbidding. Perhaps the management's policy is to discourage every caller. Yet this possibility seems to be remote, for there are very few businesses that can operate without receiving callers or sending their own salesmen to call on others.

Consider such a place as this: a reception room built like a square tunnel ending in the usual tiny window over a telephone operator's desk. Walls and ceiling painted very dark, no sign, no calendar, no show-case, no picture—nuthin'—to relieve the monotony. No ash tray, or cuspureen. One window in the outside door. Two small wooden benches, home-made and without backs, also painted with the same dark forbidding color. Seating accommodations for four averaged sized men.

One of the men who were waiting had his arm in a bandage and sling. Another had a large coil of wire and a kit of tools. Another appeared to be "just waiting." Two salesmen with heavy bags soon followed. Next appeared a chap who looked like a lawyer or business man. Each made his mission known to the unsmiling girl at the switchboard by bending his head down to the tiny window in a position where conversation was awkward. Each received a non-committal answer. Each was told he could wait.

The callers milled around the tiny tunnel for there were not seats enough to go around. Minutes dragged along interminably. After a half hour the man with the coil of wire was called and disappeared. After 45 minutes the girl called the man with the bandaged arm, gave him a slip of paper and he too disappeared. Our own turn came in a few minutes short of an hour. How long the other visitors who had preceded us had been there can only be conjectured.

Why any caller should be required to stand for an hour is not yet apparent. Certainly it is an ordeal not conducive to any amiable frame of mind. One wonders about the man with the bandaged arm. Did he have a claim against the company? Would he press it more vigorously because of the long uncomfortable wait? Who was paying for the time of the electrician? And exactly who was on the receiving end of the muttered curses with which anyone could heartily agree?

What's the result? Bad public relations. For public relations is nothing but the sum total of what a lot of people think about the company. The foregoing case probably originated in thoughtlessness. But it should always be recalled that public esteem is lost —never created—by such thoughtlessness.

If you want the public to think well of your outfit; it's wholly up to you.

Uniform Results From Batch Operations Obtained by Quality Control

Starting with raw material selection and following up with precise control of each step in processing and distribution, world's largest brewery supplies to consumers a uniform, quality food product.

By B. H. NISSEN
Anheuser-Busch, Inc., St. Louis, Mo.

This is an article on

QUALITY CONTROL

It is of interest to

All Food Manufacturers

Because it shows how Anheuser-Busch, Inc., has instituted quality control through every step in its operations, thus assuring a food product always uniform in all quality factors, in spite of the fact that it must be manufactured in batches — The Editors.

IN the making of such products as brewers' malt, beer, bakers' malt sirup, corn products and yeast, as done on a large scale by Anheuser-Busch, Inc., raw materials selection, process control and continuity of operations play highly important roles in the production plant practice.

They make for a uniformity and standardization in quality of raw materials used and finished products made that are otherwise very difficult to obtain when plant operations are carried out on a smaller scale. As yet, technical and engineering progress has not reached the stage of development in these particular industries which permits continuous operation in a strictly automatic manner.

However, these are only some of the safeguards used to assure uniformity and superior quality in Anheuser-Busch products. Each operation is carried on under such mechanical control devices as will apply and under close control laboratory supervision, as well as supervision by experienced operators. That these measures are successful can be seen in the steadily increasing demand for Anheuser-Busch products, especially for Michelob and Budweiser beers.

Before malting barley has been harvested, samples are collected and sent in to Anheuser-Busch's central laboratory for evaluation. Data on each sample are used by the grain purchasing department for guidance in making barley purchases.

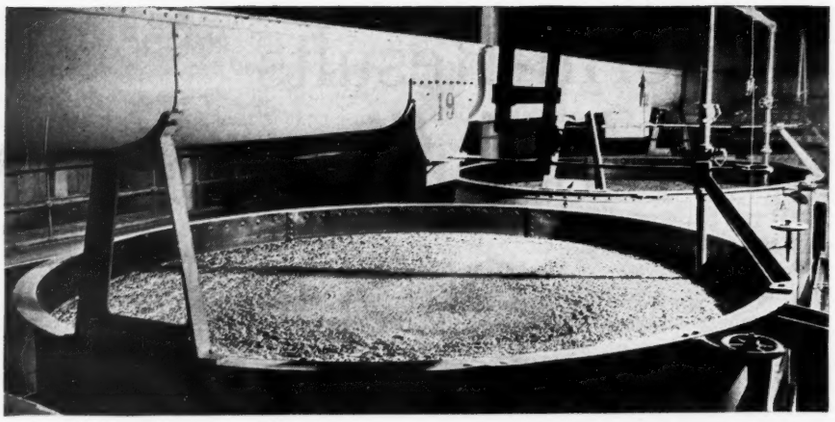
The control practices in the making of these beers go back to the selection of the malt from which the beer wort is obtained. They carry through the combining of the brews in the starting vats and the closed fermenting vats into the 2,000-bbl. storage and aging tanks from which the beers are drawn through meters to the bottling house or keg filling department.

These controls begin with selecting the right quality of barley for malting and extend to cleaning and grading of the barley, steeping and sprouting it to make green malt, drying and cleaning the malt preparatory to aging storage and, finally, cleaning, grinding, and blending for use in the brewhouse. All of these operations and processes are carried out under time, temperature, and humidity control.

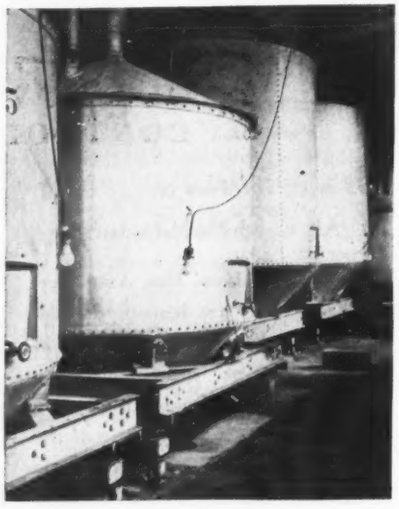
Little does the beer consumer suspect that careful selection must be made of the seed sown by the farmer for the growing of malt barley. Of the more than 250,000,000 bu. of barley grown yearly in the U.S.A., only about 60,000,000 bu. (one-fourth of the total crop) is suitable for malting. Even at that, not all of this

malting barley is suitable for making a high quality beer.

As the barley maturing season opens, field men sample the crops in the various barley growing areas and send the carefully identified samples to our general laboratory in St. Louis. By the time the crop is threshed and ready to move into the market, the laboratory has completed its examination of the samples, including sprouting or germination tests, and has reported what barleys are suitable for malting by Anheuser-Busch. Upon purchase and arrival at the plant, the grain goes through a series of cleaning operations before it gets to the malt house.



In malting practice, the cleaned and graded barley is water-treated in 600 bu. steel tanks to wash the exterior of the kernels thoroughly and to bring the moisture content to the correct percentage for sprouting.



Correct proportion of ground malt and rice in each brew is assured by use of scale tanks as hoppers between the roller mills and the cooker-mash kettles.

The first step is the removal of sticks, straw-lengths and threshed out heads. Next to be taken out are other grains, seeds, and dust. And finally the broken grains are eliminated because they will not germinate and may become a source of difficulty later on. After all these foreign and undesirable substances are removed, the cleaned barley is graded or screened into three classifications, based on size of the grains. This classification makes for easier handling and better control over subsequent brewing operations.

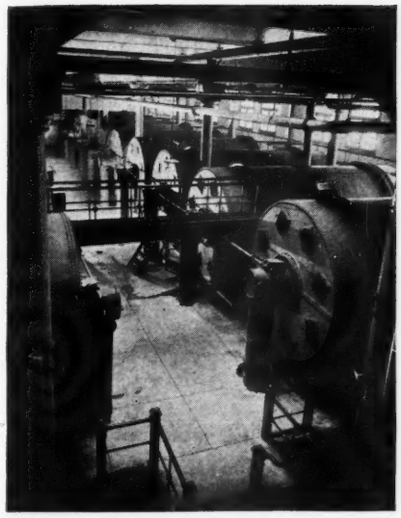
Graded and classified in this manner, the large-grained California or the two-rowed Oregon barleys can be malted by our plant procedure just as readily as the smaller grained and thicker husked types from the Midwest. Unless the barley grains are grouped according to size so that the correct modifications are obtained within the grains and the optimum amount of enzymes—largely the starch converting diastase—are developed during malting, considerable trouble may occur during brewing.

To get these desired biological and chemical changes in the barley, the maltser watches every step of his malting operations with the greatest of care. To that end, only cleaned and graded barley goes into the large cylindrical steel tanks where, after several changes of fresh, temperature-regulated water, it becomes soaked. The water is softened to the desired degree for the particular type and grade of barley being steeped. At a predetermined stage in the steeping operation, the barley is drained free of excess water and dropped by chute into large, specially constructed, horizontal, cylindrical drums. As these drums revolve very, very slowly, a uniform flow of carefully humidified and tempered air permeates through the soaked grain while it gently tumbles about over baffles and perforated air ducts fitted inside the drums. Under these controlled conditions, the grains germinate; small rootlets sprout at one end of each kernel; and, within the kernel, the acrospire or vegetative sprout develops between the husk and the starch-containing endosperm. The manner in which these changes take place in the barley enables the experienced malster to know how the malting is progressing. His objective is to have as many barley kernels as possible develop an acrospire from two-thirds to three-fourths of the length of the kernel in a given period of time, that growth indicating that his malt is germinating properly. A good malster knows the proper technic to bring the barley to the desired sprouting stage at the right time and to retain in his malt the proper degree of modification that characterizes good malt.

To stop the growth of the sprouted grain and to avoid over modification in the malt when the germination in each drum is at the desired stage, the green malt is quickly emptied into a screw conveyor for transfer to the drying floors. Each floor will handle as one charge the green malt coming from several of the large sprouting drums.

The dryers consist of long bins, with perforated floors, built over coke-fired kilns. Since the firing of the kilns is regulated to maintain a definite cycle on a temperature recorder chart, a constant current of heated air is drawn through the layer of green malt until the malt is dried to approximately 4 per cent as compared to 12 to 14 per cent moisture for cleaned barley. Uniform drying of the malt is aided by the gentle stirring and turning-over action of large revolving plows which move from end to end of each bin every hour. Since each type and grade of barley is sprouted separately, it is also dried, cleaned free of dried sprouts, and stored separately for aging before use in the brewery.

To get the malt qualities he wants, the brewmaster not only specifies how the barley shall be malted but he may also use a blend of malts. These malts are re-cleaned and ground separately in the brewhouse to assure the desired freedom from dust or loose husks as well as uniformity of grind. For grinding, roller-type mills with two upper or break rolls and three lower or granulating rolls are used. The setting of the roller mills is adjusted to give rather large husk particles which are to serve as straining medium for the wort as it leaves the straining vat or lauter tub,



Sprouting of the steeped barley is carried out in 600-bu. cylindrical drums into which filtered air of regulated temperature and humidity is forced.

and endosperm particles sufficiently fine to give complete conversion and extraction in both the mash tub and the lauter tub.

Rice, which is a very desirable addition to the brews, is usually also ground in much the same way as the malt. It must then be subjected to cooking in the presence of a part of the malt mash to render it partially soluble and mobile enough to flow into the malt mash.

Together the starch of the malt and of the rice become converted by the diastase enzyme in the malt into varying amounts of maltose, maltodextrine and dextrine. The percentage of these substances depends very much upon the temperature of mashing, for at lower temperatures more maltose is produced than when mashing is carried to a slightly higher final temperature.

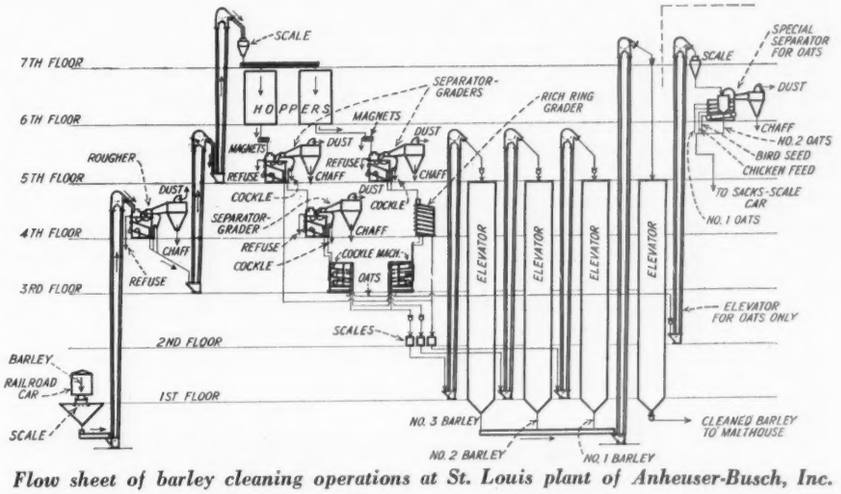
This mashing operation is conducted so precisely from brew to brew that the resulting sugar-dextrine ratio remains very constant, as observed by the usual routine sugar analyses. The wort itself is also further checked by special fermentation tests. Such uniformity of mashing is desirable as it indicates regularity of process and predicts uniformity of quality for the finished product.

All rice for the foregoing purpose is first carefully selected in the field and is then inspected on arrival, and analyzed, principally for moisture, oil and extract. Only rice very low in oil, high in extract and acceptable in appearance and odor is used.

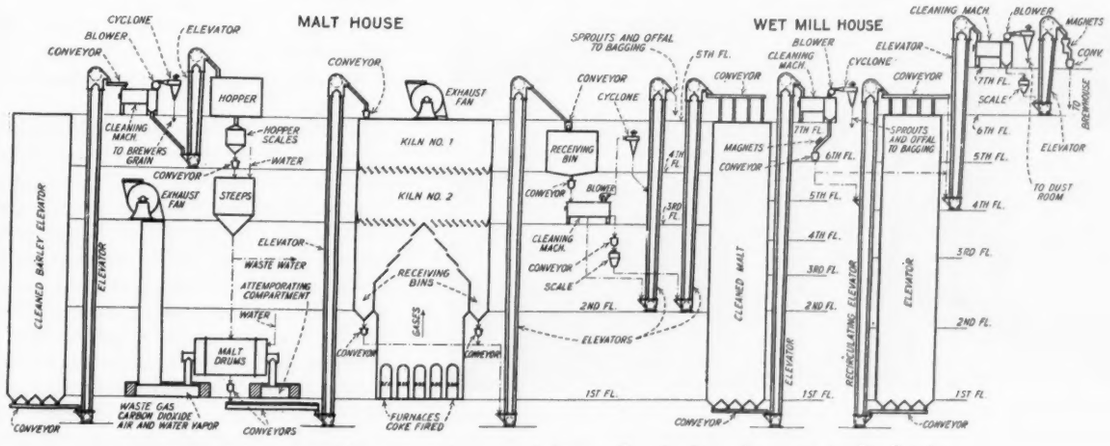
When the starch has been completely converted, as indicated by the usual iodine tests, the mash is transferred by gravity to other tanks with slotted false bottoms known as lauter tubs. Here the wort strains through the hulls which serve as the filtering medium and thus the wort is delivered to the brew kettles almost clear. Subsequent washing of the grains is carried only far enough to secure complete extraction of the sugars. It is stopped before undesirable husk substances are removed. .

During the boiling of the brew, which now follows, a carefully prescribed quantity of hops is added. These hops are specially selected for their aroma and appearance, and their desirable brewing qualities. Hops low in seeds and foreign matter, and high in the soft resins are preferred. Boiling of the brew continues until a certain desired "break" of the proteins is observed. The hot wort is then separated from the hops and immediately cooled by passing over Baudelot coolers.

The Budweiser brew now contains a given extract in solution and is usually very uniform in color, acidity, pH, protein, mineral matter and sugars, and most of the other factors regularly determined for control purposes. The other types of brews also leave the brewhouse very uniform in composition, but in order to make each type of beer in the end even still more uniform, a mixing operation of brews is conducted on a large scale so that a single bottle of Budweiser, for in-



Flow sheet of barley cleaning operations at St. Louis plant of Anheuser-Busch, Inc.



Flow sheet of malting operations at Anheuser-Busch, Inc., brewery in St. Louis.

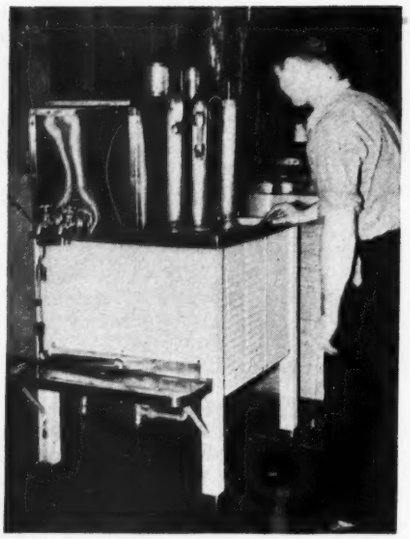
stance, may represent the contents of many brews of beer.

In the pure culture laboratories are kept the original cultures of the yeasts which give to the various Anheuser-Busch beers their individual flavor and aroma. These must be always uniform and, of course, very pure and active. Only by a continual and careful vigilance can all this yeast always be the same.

In the next step of the brewing operation the brews enter the starting cellars where measured quantities of the yeast are added. Some hours later these yeasted brews go to the fermenting cellars where the beer is held in large, closed tanks. These are very special in design and are of patented construction to remove certain undesirable fermentation residues which may otherwise redissolve in the beer. Here the carbon dioxide, resulting from fermentation, is also collected. In these cellars every brew is fermented to the desired point in the specified period of about two weeks.

It then flows to the lagering or aging cellars into large vats, some having as much as 2,000-bbl. capacity. Here the beer rests for several weeks at a temperature around freezing during which time a slow after-fermentation or krausening takes place. The creamy, tiny bubbled foam of Anheuser-Busch beers is attained by this process of krausening, for here it is that the carbon dioxide naturally produced by the slow after-fermentation becomes very intimately combined and impregnated in the beer.

After many weeks the beer is now ready for its final process, filtration and filling into bottles, cans and barrels. Specially designed filters are used for this purpose in which the beer passes through thick pads of a carefully selected cotton fiber. These filters remove the yeast residues and certain types of unstable proteins, giving a brilliant, crystal clear beer with the desired CO_2 content.



Checks on concentration of wort are made as frequently as necessary, at a constant temperature of 20 deg. C., by pouring the boiling wort sample into a unit cooler and then running a Balling test on the cooled 20 deg. C. wort.

In the handling of Budweiser and other Anheuser-Busch beers even unnecessary contact with air must be avoided, for air is injurious to the quality of a fine beer. Instead of air, carbon dioxide is always in contact with the beer wherever it is stored, handled, or moved from one tank to another.

After cooling to fermenting temperature, the mixed wort is seeded with pure culture propagated yeast and held for several hours under filtered air and controlled temperature conditions in specially built "starting" cellars.

Thus, in the bottling, canning and filling of barrels, special precautions must be taken to leave in the package only beer and its natural gas, carbon dioxide. This is done by special fillers which place the container under counter-pressure before the beer enters and thus retains only carbon dioxide above the beer as the crown or bung is applied.

All this control over the quality of the beer itself would be in vain if equally meticulous care was not taken in the preparation of the kegs and bottles as containers. The best equipment and technic known for the cleaning and sterilizing of the bottles are used. Also, thoroughly clean and sterile kegs are assured by washing with hot water, melting out of the old resin pitch with air heated to 600 deg. F. and recoating with new pitch heated to at least 400 deg. F. This procedure is followed for each wooden keg each time it is used. In the case of the stainless and aluminum steel kegs, the pitching operations are unnecessary. Those kegs get a thorough washing and sterilization comparable to that received by the bottles.

All these precautions are not sufficient to assure that the beer reaches the ultimate consumer at the high level of quality it leaves the brewery. Anheuser-Busch follows its beer to its established market outlets with its Service Department. The self-sealing Golden Gate type of valve is fitted into the kegs to prevent insertion of substances or objects that might contaminate the beer. Storage conditions, dispensing faucets, hoses, and coils, and the service glass washing are checked on and inspected regularly to assure sanitary and otherwise favorable conditions for the beer to get from the keg to the consumer under the best quality conditions. Even the manner in which the beer is drawn into the glass is regarded as an important factor and proper instruction on that point is considered a point in control over the quality of the finished beer.

In this manner Anheuser-Busch quality control covers every detail in malt and beer making and marketing from testing the ripening barley to the washing of the glasses in which the finished beer is served to the consumer in established market outlets. Good beer requires painstaking care in the making and is a food product which is highly perishable in character. Constant attention to details of manufacture, handling and marketing is essential to control over its quality until it is consumed.

Britain Gears *Food Resources* To War Time Needs

American industry will be affected by steps to cut imports and increase production at home.

By H. B. CRONSHAW
Editor, Dairy Industries
London, England

British Combine Photos, Ltd.

Determined to "fight and win this war on full stomachs," the British are putting parks, golf courses, pastures and back yard "allotments" under cultivation in a national "grow more food" campaign. Imports are being reduced.

BRITAIN is busy massing her big guns on the food front. She is mobilizing on an unprecedented scale the entire food resources of the country—growing, manufacturing, storage, distribution—to insure adequate supplies for the people. The Minister of Agriculture has announced that "we will fight and win this war on full stomachs." The central feature of this campaign is the speeding up of home production to the maximum extent possible. Normally, British farms produce nearly half the country's food requirements.

In time of peace we had been farming more and more on the lines of grassing down our fields, increasing our livestock and looking abroad for their rations. But now circumstances have changed. We cannot, in war time, count upon uninterrupted, unlimited supplies of feedstuffs from abroad. We have to conserve our ships and our payments of money abroad. We must produce not only more food for ourselves but also more food for our livestock.

Accordingly, at the very outbreak of war, the government put into action a vigorous plan of plowing up an extra 1,500,000 acres of land. Generally speaking, the policy is to sow cereal or fodder crops or potatoes. Wheat production must be increased, both on existing and newly plowed land. The idea is to get back to the old principles of mixed farming, with rotation of crops and make the land produce to the full.

As yet there is no material shortage of labor on the land, but to insure against possible future contingencies a Women's Land Army, 25,000 strong, is being trained.

But the campaign to produce more food extends far beyond "the man with the plow." An intensive drive is on foot to get the whole nation digging, and the spade, wielded by the ordinary citizen on his small plot of ground, known as an allotment, is destined to play a very important part in war time food production.

The immediate aim is for 500,000 more allotments to be brought under cultivation. A similar drive in the last war resulted in over 870,000 new allotments. It is estimated that the half million more allotments will add nearly 4,000,000 pounds' (almost 16,000,000 dollars') worth of food to the nation's supply, and by production in the locality where it is consumed will save over 100,000 tons of transportation. Another way of putting it is that the allotments will provide potatoes and vegetables to feed another million adults and 1½ million children for eight months out of twelve.

All livestock owners are being urged to do as much as they can to grow their own feedstuffs and to become less dependent on imports. As regards dairy cows, beef cattle and sheep, the outlook for feedstuffs is much more favorable than for pigs and poultry. The supply situation with regard to oil cakes and meals, which constitute the chief form of concentrate for winter fattening, is more favorable than in the case of cereal products.

The Ministry of Food is arranging to be the only buyers of fat cattle, sheep and pigs, at fixed prices according to grade. An adjustment of these prices will be made from time to time in the light of seasonal trends and variations in production cost. The Ministry will shortly, through agents, undertake the slaughter of fat stock in the United Kingdom. The stock will be purchased on behalf of the Ministry at collecting centers. Also, the Ministry has issued a list of maximum prices for feedstuffs.

A decree issued on Dec. 2 revokes a number of previous orders. It is not now compulsory for fat stock to be sold in livestock markets, and the

prices prescribed for fat stock and pigs no longer apply. The wholesale and retail prices of fresh meat, including pork, are freed from control, but the prices of imported meat, both wholesale and retail, remain unchanged.

In this country, sheep have many points in their favor. For one thing, there can be no immediate increase in the number of fat cattle, as they take, on an average, two years to reach maturity. Therefore, an increase in the sheep population is the best insurance against a reduction in imported meat, and the Minister of Agriculture is making an appeal to farmers to retain their old ewes and ewe lambs for breeding. Encouragement has been lent to the sheep policy by fixing the average price for sheep, thus obviating the danger of any price break by overproduction.

The pig made a remarkable contribution to victory in the last war, and since those days the pig population has increased by well over a million. Village pig clubs were formed all over the country and cottage dwellers and others were encouraged to keep a pig or two on the allotment or in the garden. In this way five million pounds of extra bacon was added annually to our supplies. Moreover, pig breeders were given a ready market for young store animals.

Much the same plan is being followed in the present war. Towards the end of September imported pork in all cold storage was requisitioned.

The question of feedstuffs is the one which is at present receiving most attention. We have grown more and more into the habit of keeping pigs on cereal rations largely imported from abroad, and pigs, as well as poultry, are particularly heavy users of imported grain and cereal products such as barley and corn meal. The pigman's favorite formula was 65 barley meal, 25 middlings and 10 fish meal. Now we have to return largely to home grown rations of the kind used for generations before oil cake and other concentrates were known.

Fortunately there is ample scope for this change. The basic consideration is that the pig is an omnivorous animal and is a great converter of waste into human food. On this principle the pig will be used to turn garden, household and farm waste into meat at a great saving of imported cereal food.

If necessary, the pigs can be finished with a few weeks of sty feeding on concentrated foods. Farmers are reminded that special forage crops for pigs can be grown, such as clover, lucerne or ordinary pasture. The best substitute for cereals is the potato. Finely crushed oats, in which this country is practically self-supporting, can be used largely to replace wheat, barely or corn. In fact, wheat, barley, oats, corn or even dried sugar beet pulp are all more or less interchangeable.

From the time he weighs about 50 lb., the Nazi pig is limited to 2½ lb. of meal and must find the rest of his diet from such farm produce as potatoes, silage, roots, sugar beet tops and kale. It takes him longer to finish, but he gets there in the end.

The backyard hen, along with the cottager's pig, is being placed on a war time footing. This war we start with almost double the number of hens that existed at the beginning of the last war. It is being pointed out to the "little man" that a hen will produce ten times her own weight in edible produce in a year, and will make a good meal after that. Also, her eggs can be more economically cooked than any other protein food. With the pig and the hen, the cottager can grow his own bacon and eggs.

In this country, poultry farming has grown on specialized lines and, being largely dependent upon imported grain and mash, presents special problems in war time. Divorced from the land, specialist poultry keeping expanded too rapidly, and the industry was subject to disease. There is, however, no difficulty in fitting the hen into the scheme of war time food production, and the general farms, which carry the majority of the country's hens, will be able to improvise rations to supplement what the hens can find for themselves.

Towards the end of November, the Minister of Agriculture announced that pig and poultry producers must expect a cut of at least one-third in their peace time rations. No doubt the denial of the luxury of a full ration of barley meal and corn will release more shipping for other purposes.

The Minister of Food has prescribed the maximum prices at which eggs may be sold by wholesalers to retailers and by retailers to consumers. These prices are adjusted in accordance with seasonal conditions. Retailers must clearly indicate the categories, descriptions and prices of all eggs offered for sale.

Prices for what is sold off the farm are being fixed—in much the same way as was previously done for wheat, milk and hops—and the costs of fertilizers, feedstuffs and so forth are being fixed also. The Minister of Agriculture has given his assurance that these two vital factors are being closely watched to keep them in step. He has also assured farmers that they will get reasonable returns for the staple crops harvested in 1940, taking into full account any increase in cost of production.

In the middle of September the Ministry of Agriculture announced that the country had more supplies of wheat than it ever had before. Partly to encourage a larger acreage for wheat and oats for 1940, the standard prices of these were raised in early November.

On Dec. 1 an order came into effect for controlling the marketing of the home grown wheat crop. It enables the Ministry to decide what proportions after threshing are to be allocated for milling and for feedstuffs in accordance with the general situation, including the program of imported

British Combine Photos, Ltd.

British troops somewhere in France forget the Nazis long enough to line up for lunch.

supplies. The Ministry does not purchase the crop, but requires all registered growers to sell wheat to approved buyers, who are either the flour millers or the merchants authorized to give certificates under the Wheat Acts.

Next to wheat, rye was at one time the chief grain crop in England. The chief reason for the decline was the preference for a perfectly white bread. In northern European countries it is still by far the most important bread crop. As rye is, with the exception of wheat, the most suitable grain for milling (and the manufacture of "crisp bread"), the suggestion is being made that poor, light soils should be increasingly sown to this easily cultivated crop.

There is a record apple crop this year. The humid, mild climate of England produces apples with an abundance of juice and richness of flavor. As regards dried fruits, the Ministry of Food is the sole importer. Stocks are distributed to registered dealers on the basis of their past trade requirements. There is one maximum price for each variety of fruit, irrespective of quality or country of origin. The trader who opens up the original packages is instructed to blend his supplies so that a product of fair average quality is available for his customers.

Prices of potatoes are under the control of the Ministry of Food in respect to growers, wholesalers and retailers and in respect to the different varieties grown in various parts of the country. At the present it is not proposed to interfere to any extent with ordinary channels of distribution and trade practices, beyond urging increased cultivation.

The production of other kinds of pork is discouraged in favor of bacon. When the rationing of bacon starts, the production of bacon and hams will be limited to firms licensed by the Ministry of Food and in premises specified in the license. There is no intention of extending the licenses beyond those issued by the Bacon Development Board under the Bacon Industry Act of 1938.

To insure equitable distribution, all imports of bacon and hams (including canned bacon and hams) are requisitioned by the Ministry of Food. Except for those needed for storage and for the service, they are disposed of on behalf of the Ministry by a collective organization of traders, the Bacon Importers National Defense Association, Ltd. Home curers of bacon are also required to sell their produce through this government agent.

At the outbreak of the war a scheme of control for fish was introduced, but later in September it was decided to abandon the scheme and revert to the auction system of sale, subject to the institution of maximum prices at the ports and to the consumer.

At the beginning of October it was announced that at a later date the government will be responsible for purchasing all supplies of canned salmon for the United Kingdom and will sell to primary buyers for distribution to the wholesale and retail trade. A primary buyer is defined as a person, firm or company who, during the three years ended Aug. 31, 1939, purchased 75 per cent or more of his or their imported canned salmon direct from overseas or through brokers, and during that time distributed 75 per cent or more of such goods through his or their own distributive organizations to secondary wholesalers or retailers.

On Oct. 19 the Ministry of Food ordered returns to be made every fortnight on stocks of canned salmon exceeding 300 cases, including goods consigned or in transit. On Nov. 22 a similar order was made by the Ministry relating to stocks of canned brisling, herrings, pilchards, sardines and sild exceeding 100 cases.

In the middle of September, maximum wholesale and retail prices for condensed milk were introduced provisionally. These prices were raised at the beginning of October in consequence of the budget increase in the duty on sugar, and followed by a further increase on Nov. 9 owing to the advance in the price of milk.

British Combine Photos, Ltd.

Preparing food ration books for the British at the Food Executive Office in London. The books contain a number of different leaves for different foods.

In the middle of September maximum prices for the sale of butter were fixed. About a week later the Ministry of Food began requisitioning all butter in registered cold storage in Great Britain, all imports arriving and all butter manufactured in the country. This butter is disposed of by the Ministry of Food through selling agents who distribute it through the normal trade channels.

Food rationing was introduced on January 8, the weekly ration being 4 oz. of butter per capita, 12 oz. of sugar and 4 oz. of bacon or ham.

A provisional control order for margarine and cooking fats, introduced in early September, and a requisition order, in early October, were revoked in November, except in so far as the latter applies to the licensing of manufacturers and wholesalers of margarine and cooking fats and of dealings in stocks abroad. The effect of the order is to decontrol the manufacture of margarine and cooking fats. Manufacturers, wholesalers and retailers of these products, are, however, required to be licensed.

Prices have been fixed for animal oils and fats. As regards vegetable oils and fats, an order was made on Oct. 4 the effect of which is to bring under complete control the industries engaged in the crushing or extracting of oil from oilseeds, nuts and kernels and in the refining of vegetable and marine oils. The object is to safeguard the supplies of raw materials for the margarine and compound cooking fats industries, and to insure economical production at all stages. It will also prevent wide fluctuations in the prices of these fats.

In the last war we grew practically no sugar beets, but this year 340,000 acres have been growing, which should provide at least a quarter of our sugar supplies. A further benefit is the provision of beet tops and crowns for fresh fodder, and also beet pulp and molasses. Dried beet pulp is often used to replace roots in maintenance rations, and it can also replace cereals in production rations.

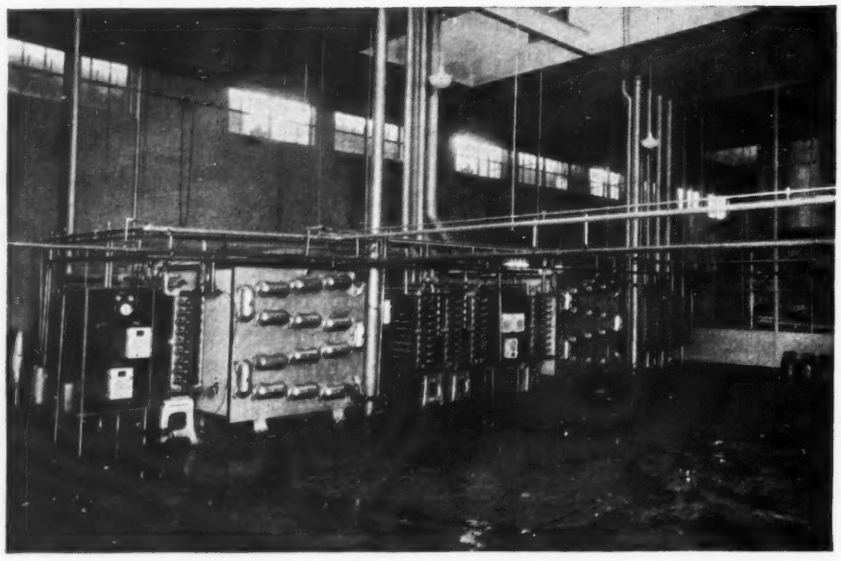
Maximum retail prices of the various grades of sugar and the maximum wholesale prices of liquid glucose and invert sugar are under the control of the Minister of Food.

The Ministry of Food contemplates the introduction of national control or "pool" tea, but at present there is no question of the immediate introduction of a single standard blend of tea.

Short-Time Pasteurization

As It Looks To the Milk Plant Operator

By W. D. DOTTERER,
Bowman Dairy Co., Chicago, Ill.



Tubular heater-holder system at Mayfair plant of Bowman Dairy Co., used to pasteurize 28,000 lb. of milk per hour when 30-minute holding period method was used. A third holder, not shown, was used as a spare, being operated when one of the other two was being cleaned. Note large floor space needed for the installation and for cleaning of tubes.

Part I*

EXPERIMENTATION with short-time, high-temperature pasteurization during the past few years shows that it has several advantages for the milk plant operator over the older 30 minute holding period method.

Some of the advantages are of an engineering rather than of a sanitary character. The first cost, an important item, is less. Less floor space is required than for the 30 minute holders of the same production capacity. Less time is required for cleaning and, in comparison with some types of holders, the surfaces exposed to milk are more accessible for inspection. There is much less milk in the "short-time" apparatus than there is in the 30 minute holders during operation. When operating, the 30 minute holding system will always contain at least as much milk as can be pasteurized in 30 minutes; the "short-time" system contains only about as much milk as will be heat-treated in 16 seconds. This reduction in volume of milk in the pasteurizing system makes for closer estimation of the quantity of milk to be pasteurized to fill an order.

From the standpoint of flavor, milk pasteurized by the "short-time" method appears to be an improvement over that by the 30 minute holding method, having less cooked flavor.

During these years of experimentation, improvements and refinements in control over time and temperatures have been made with the result that public health safety is well provided for. While bacteria counts in the "short-time" milk are somewhat higher in most cases than when the 30 minute holding method is used, the difference on the whole is not serious. Thermoduric or heat-resistant bacteria survive "short-time" pasteurization in a greater number.

This fact seems to be the principal disadvantage of "short-time" pasteurization in comparison with the 30 minute holding method. But, since a good milk supply will not contain a significant number of heat-resistant organisms "short-time" pasteurization can be used satisfactorily when the raw milk is of acceptable quality. Thermophilic bacteria—those microorganisms which multiply at pasteurization temperatures—are sometimes the cause of high counts in pasteurized milk. None were found in our study of "short-time" pasteurization. This absence of thermophilic bacteria offsets to some extent the number of thermoduric organisms which do survive "short-time" pasteurization. Phosphatase tests were always satisfactory on "short-time" pasteurization and indicate the destruction of any pathogenic bacteria which might have been in the raw milk.

Our personal experience with "short-time" pasteurization began in December, 1937, when an installation was made to determine the effect of the method upon bacteria counts, cream volume, flavor, and the like.

At that time, the Chicago Board of Health had not approved "short-time" pasteurization. Milk which was heat-treated in "short-time" equipment had to be pasteurized by the 30 minute holding method before being marketed in Chicago. This restriction made short runs on the "short-time" equipment necessary with the result that adequate control was difficult. Much of the early data was of little value except as an indication of what could be expected.

The results of a few of these preliminary tests are summarized to indicate the effect of different tem-

Table I—Comparative Bacterial Counts in Milk After 30-Min. Holding Time Pasteurization and Short-Time Pasteurization With and Without Extra Holding Time.

Milk No.	Raw Count	Pasteurized Short Time	Phosphatase	Pasteurized 30 Min. Holding
1. ...	79,000	11,000	3–3	7,800
2. ...		9,500	3–3	
3. ...		7,700	3–3	
4. ...	120,000	11,000	3–3	7,800
5. ...		12,000	3–3	
6. ...		13,000	3–3	
*7. ...	110,000	19,000	3–3	
*8. ...		13,000	3–3	8,200
*9. ...		13,000	3–3	
*10. ...	68,000	8,500	3–3	
*11. ...		9,700	3–3	6,200
*12. ...		9,800	3–3	
*13. ...	170,000	11,000	3–3	
*14. ...		12,000	3–3	6,000
*15. ...		13,000	3–3	

* With 9.5 sec. extra holding time at 157 deg. F.

* Based on a paper read before Chicago Dairy Technology Society.

This is an article on

—PASTEURIZING

It is of interest to makers of

Ales and beers
Butter and cheese
Carbonated beverages
Fruit juices
Milk, cream, ice cream
Mineral waters
Wines

Because it gives the results of tests carried out to compare the familiar 30-minute holding-period method of pasteurization with the newer continuous, time and space saving short-time method—The Editors.

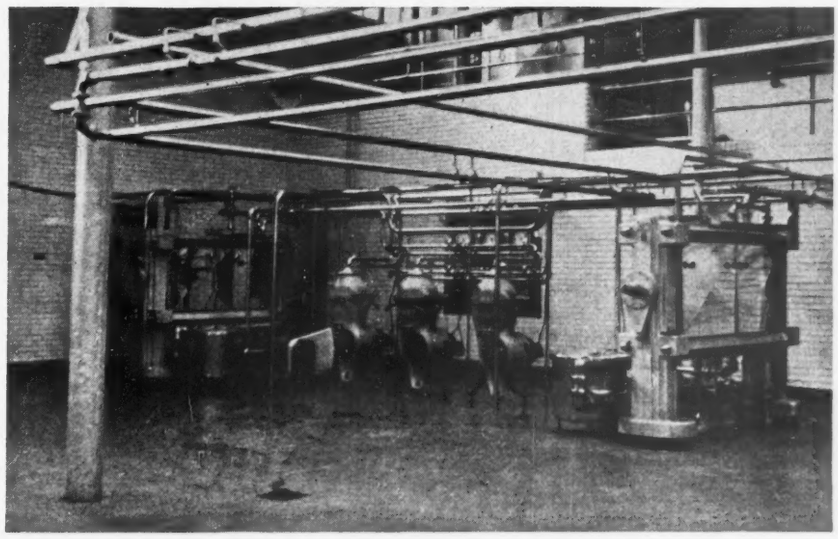
peratures on bacteria counts, cream volume, and phosphatase test. In general, the higher temperatures give lower bacteria counts when the same raw milk is used but when raw milk from different sources is pasteurized the variations in bacteria counts are not consistent with the variations in temperatures used. Reduction in bacteria varied from 89.5 to 96 per cent at 161.5 deg. F. when different lots of milk were used. (The variable results were largely because of the varying numbers of heat-resistant organisms in the raw milk.)

These early tests indicated that heat-treating temperatures above 158 deg. F. will result in satisfactory phosphatase test reactions when the milk is held 16 seconds at those temperatures. Temperatures of 158 deg. F. and lower did not give satisfactory phosphatase test results. Flavors on all milks pasteurized at 161 to 161.5 deg. F. for 16 seconds were very good.

Additional tests were made in March, 1938, comparing the duo-short time method of pasteurization with the 30 minute holding period method (see Table I).

Table II—Comparative Bacterial Counts in Milk During One-Day Run to Show Effect of the Duo-Feature of the Short-Time Pasteurizer.

	Without Duo-Feature		With Duo-Feature		
Milk No.	Raw	Pasteurized	Raw	Pasteurized	Date
1...	100,000	6,400	140,000	6,600	Nov. 17
2. ..		6,700		7,000	
3. ..		7,700		7,400	
4. ..		8,100		7,100	
5. ..		4,600		5,600	
6. ..		8,600		7,700	
7. ..		7,800		9,700	
8. ..		5,300		7,800	
9. ..		7,100		12,000	
10. ..		5,500		8,300	
11. ..		2,000		6,900	
Average			Average		
Raw.		100,000	Raw.....		140,000
Pasteurized		6,400	Pasteurized		7,900
Reduction.		94.7 per cent	Reduction.		94.3 per cent



Floor space needed at Mayfair plant of Bowman Dairy Co., for short-time high-temperature installation to pasteurize 28,000 lb. of milk per hour. Space is less than one-quarter that required by the 30-minute holding system formerly used, and no additional floor space for cleaning is required. The three central units are clarifiers, with plate heat interchangers and pumps at each end.

In the duo-short time pasteurizer the raw milk was passed through the regenerator to a preheater to bring it to 157 deg. F. It was cooled to 143 deg. F. before being finally heated to 161 to 161.5 deg. F. with a 16 second holding period followed by passage through regenerator and final cooler. Portions of the samples were held at 157 deg. F. for 9.5 seconds by inserting a length of pipe between the preheater and precooler to determine the effect of the holding period at 157 deg. F. upon the bacteria content of the milk.

Samples 1 to 6 pasteurized in the regular duo-short time equipment had an average micro-organism count of 10,700 when operating with the regular 30 minute holding period. Since the average raw milk organism count was 99,500, the percentage reduction was 89.2. When samples 7 to 15 were pasteurized with a 9.5 second additional holding period at 157 deg. F., the average count was 12,100; a reduction of 89.6 per cent from the average 115,000 raw milk count. Although the bacterial effectiveness of the "short-time" pasteurization was not appreciably changed by the 9.5 second holding at 157 deg. F., the cream volume was reduced considerably. The average count of all fifteen raw milks was 106,000, with a reduction to an average count of 7,200 (93.2 per cent) by the 30 minute holding period pasteurization.

With the approval of the Chicago Board of Health a "short-time" pasteurizer was installed in a production plant where milk from a single large vat could be pasteurized by different methods. A large number of tests were made to determine the effect of the duo features of the "short-time" pasteurizer. Table II contains some of the results obtained when milk from the same vat was pasteurized both with and without the duo feature operating.

Reductions of 94.3 per cent with the duo feature, and of 94.7 per cent without, for the one day runs were checked by comparative runs over a thirteen day period with little difference in the average results; 92.8 per cent with the duo feature and 93.6 per cent without. The counts varied considerably in both the raw and the pasteurized milks. Some milks showed evidence of containing heat-resistant organisms, which would give a corresponding low percentage of reduction. Results of these tests indicate that the short-time pasteurizer with the duo feature has no advantage over the same pasteurizer operating without the duo feature.

Part II of this article will appear in Food Industries, *March, 1940*

SHORT TIME – HIGH TEMPERATURE
MILK PASTEURIZING PLANT
Milk receiving from trucks
Dumping
Weighing
Pumping
Dump tank and receiving vat
Filtering
Heat exchanging (Cooling)
(Refrigerated storage) tanks
Storing
Pumping
Empty cans
Empties to trucks
Can washing
Bottle washing
Empties from trucks
Empty cases
Case
Hood bottle conveyor
Filling
Surge tank
Bottling casing
Instrument board and hot water circulating
Duo-shortime posteurizing
Cases to storage
Holding tube
Preheating
Pre-cooling
Water
Preheating
Regeneration
Final cooling
Brine
Float tank
Flow diversion valve
Case washing

Blood Substituted for Flour In Sausage Manufacture

European packers convert waste product to food ingredient by centrifuging

By R. G. WALKER
Manager
Special Industrial Application Department, De Laval Separator Co., New York, N. Y.

EUROPEANS have found a new use for blood as a food ingredient, with important savings to the meat packer. During the past few years, the food industries of central Europe have been making strenuous efforts to develop home products and thus avoid the importation of raw material. The new use for blood is a result of this research.

A large quantity of blood from slaughter houses was going to waste or being utilized as cheap fertilizer. This blood has high food value, but most consumers object to food products made from blood. So it was not utilized directly as a food. But the European food technologists discovered that blood is a first class ingredient for sausages as a substitute for flour. Not only do sausages made with blood instead of flour taste the same as those made in the usual way, but they have the advantages of not bursting when cooked. This is due to the cohesive properties of plasma, one of the components of blood. When plasma coagulates, it binds other materials together even better than does flour.

The high nutritive value of blood is illustrated by the fact that one pint of it contains the same quantity of albumen as eleven eggs. In other words, the edible value of blood is practically equal to that of boneless meat. Unstirred blood from cows contains about 17.7 per cent of albumen; that from pigs, about 19.2 per cent.

The method by which blood is used in the manufacture of sausages is very simple. It is only necessary to obtain a separation of red corpuscles from the blood. The most practical way of effecting this separation is by centrifuging the blood in machines especially adapted to the purpose. When the blood is drawn from the animal it is mixed with a sodium citrate solution immediately to prevent coagulation (sodium oxalate can also be used). The citrate treated blood must be strained and preferably separated immediately. If for any reason centrifuging is postponed, the blood must be stored at a temperature of 40 deg. F. This avoids haemolysis; that is, it prevents osmotic pressure from causing the coloring matter in the red corpuscles to pass into the serum and discolor it. Salt must not be added to unseparated blood, as it increases the osmotic pressure and the rate of haemolysis.

The substance remaining when the red corpuscles are removed from blood by centrifuging is plasma. Both the red corpuscles and the plasma can be used in making sausages. And the corpuscles, which have a high food value, can be employed in different products, the method depending upon the purpose for which they are intended. When used for the production of red sausage they are thoroughly salted with saltpeter, as is the case when stirred (defibrinated) blood is used. For black sausages, on the other hand, they are only lightly salted, about 4.5 oz. per gallon. The red corpuscles should be prepared immediately before use, but if this is not possible they may be stirred once or twice daily and kept in a cold room at a temperature of about 42 deg. F. (not below 32 deg. F.). During the production of sausages they are used in the same way as blood. If it is necessary to dilute the sausage paste thus prepared, milk or ordinary citrate treated blood could be employed. Defibrinated blood could not be used.

Plasma can be put into all types of sausages, the quantity varying according to taste and to the supply. For example, a mixture containing 10 per cent of plasma has good binding qualities and produces an appetizing sausage. For smoked sausage the required quantity of plasma can be added when the warm sausage meat is chopped or ground. In fine liver sausage, the plasma is added to the liver. Whereas for coarser liver sausage, the plasma can be added to the ready-made sausage meat.

The plasma could undoubtedly be utilized in many other products and offers a profitable experimental field. One of the fields to be investigated is the utilization of plasmas of various colors. When the centrifuges are operated at fairly low capacities, a light yellow plasma is obtained which, in some cases, has a better binding quality than plasma of a darker color. Increasing the rate of separation turns the plasma from pale yellow to red. This red plasma coagulates upon warming to a light grey white paste without the slightest trace of red color. Within limits, a red color is no disadvantage.

A typical European case history shows the savings possible. If a packing plant handles 480 gal. of blood a week, under the old procedure, cows' blood is utilized for fertilizer and the pigs' blood put into black sausage. Under the new method, both the cows' and pigs' blood are used in the sausage, effecting a saving amounting to over $300 a week.

How this saving is achieved is shown by the following statistics:*

A Slaughter House Handled Each Week:

100 cows, yielding 270 gal. of blood
320 pigs, yielding 210 gal. of blood

Total, week.....480 gal. of blood

Prior to Centrifugal Recovery of Blood:

When no separator is used, the pigs' blood is incorporated directly into black sausages, while the cows' blood is used for low price fertilizer, or thrown away.

Black sausage normally sells for about 12 c. per lb.

Hence, 210 gal. × 10 lb. per gal. × 12 c. per lb. = $252

With Centrifugal Recovery of Blood:

90 gal. of pigs' blood is reserved for black sausages
390 gal. of blood (*i.e.*, remaining cows' and pigs' blood) is separated
Total 480 gal. of blood per week

The 390 gal. yields:

120 gal. of red corpuscles
270 gal. of plasma

The red corpuscles are mixed with the 90 gal. of unseparated pigs' blood, *i.e.*:

90 gal. + 120 gal. = 210 gal.
210 gal. × 10 lb. per gal. × 12c. per lb. = $252

The 270 gal. of plasma is used for incorporation in other sausages in place of flour. This meat sells for 12c. per lb., *i.e.*:

270 gal. × 10 lb. per gal. × 12 c. = $324

Less:

Cost of citrate for treating 390 gal. of blood 390 × 4.6 c. = $17.90

Hence, total value of products produced is $252 + (324 — $17.90) = $558.10

Total savings:

$558.10 — $252 = $306.10 per week.

* As originally given, all figures were in the English system, *i.e.*, pounds sterling. These have been changed for convenience to the American monetary system at par.

How To Use Dextrose In Canning

Factors that control the substitution of dextrose for part of the sucrose used in canned fruits and vegetables determined by experiment

Part II

Part I of this article described the various laboratory experiments carried out by the author with varying concentrations of dextrose and was published in Food Industries, *January, 1940.*

By E. W. EICKELBERG

Research Director,
Fairmont Canning Co.,
Fairmont, Minn.

FREQUENTLY the commercial judging of flavors and palatability of a canned product is apt to consist of sampling within the immediate organization, perhaps including a few buyers and possibly a few consumers in the local community. The following table, which lists the opinions of 22 people interested in food merchandising who were asked to express their preferences for peas canned with three different sugar formulas, illustrates differences in tastes. That is, nine people preferred peas canned with 50 per cent dextrose while thirteen were of different opinions.

Preferences of Food Merchandisers and Packers for Peas Packed with Dextrose

Sugar Composition	Preferences 1st	2nd	3rd
100 per cent Cane	5	5	12
25 per cent Dex. 75 per cent Cane	8	8	8
50 per cent Dex. 50 per cent Cane	9	9	2

To obtain conclusive comparative data as to flavor differences from a small group of judges, those individuals whose taste preferences and acuteness are similar should be selected. That is, ask the prospective judge if he uses sugar in his tea or coffee; salt or sugar on his grapefruit; prefers sweet or tart foods; and if he has any special dislikes. We should also bear in mind that the taste sensation may be influenced by many factors among which are: (1) strength of solution employed; (2) amount of solution tasted; (3) extent of tongue surface excited; (4) duration of application; (5) temperature of substance being tasted; (6) state of rest or movement of the tongue; (7) nature of preceding stimuli; (8) adaptation; (9) fatigue; (10) touch; (11) smell; and (12) sight.

By eliminating these variables or keeping them constant one may determine the acuteness or the threshold value of sweetness of different sugars and different tasters. Table III aptly illustrates the comparative threshold values of sweetness for dextrose and sucrose as well as differences in acuteness of taste.

It is quite obvious that the faculty of perceiving flavor varies among individuals. Inasmuch as it may be impractical to use a large representative group of people as test subjects, the selection of individuals possessing similar discriminating palates, such as B, D, F, G, and I, should yield reliable comparative data as to the qualities of various formulas and products.

A very interesting phenomenon was observed with qualified judges tasting sugars of various concentrations up to 50 per cent. Three dextrose solutions were made upon the basis of 100 per cent, 75 per cent and 66⅔ per cent equivalent sweetness as compared to sucrose for each of the various concentrations. That is, if dextrose is as sweet as sucrose, a 10 per cent solution of dextrose should taste as sweet as a 10 per cent solution of sucrose. If dextrose is only two-thirds as sweet a higher concentration, namely 15 per cent, should be equal in sweetness to a 10 per cent sucrose solution. In this manner the solutions used in the comparative sweetness tests were made up with the calculated amount of additional dextrose on the 75 per cent and 66⅔ per cent equivalent sweetness bases. The percentage of tasters who judged that the dextrose was 75 or 66⅔ per cent as sweet as sucrose in the various concentration levels are tabulated under the respective headings.

In the lower concentrations (up to 20 per cent) dextrose appears to be 75 per cent as sweet as sucrose; however, in concentrations of 30, 40, and 50 per cent sugar, dextrose solutions tend to be equal in sweetness to sucrose solutions of identical concentrations. There are possible theoretical explanations of this. Also there are practical implications. Obviously there is a level of sweetness beyond which the differentiation of the degree of sweetness is not discernible to the consumer. See Table IV.

There may be those of the opinion that the only real value of sugar in canning is its sweetness. If fruits are packed with water, the resulting product is frequently poor in texture, soft, and lacking in flavor. The same fruit packed in sugar has a better texture and fruit flavor because of the inhibited leaching action of the more dense sugar sirup and also the flavor-carrying properties of the sirup.

In preserving the delicate flavors of fruits, a sucrose sirup of sufficient density to carry these flavoring substances sometimes has a sweetening value which covers up the true fruit flavors. A blended sirup made with dextrose could have the same density which would preserve the fruit tex-

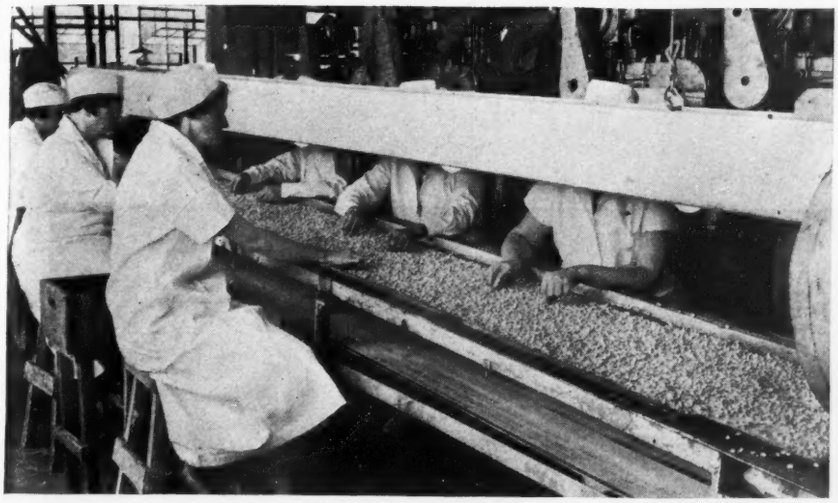
Table III—Threshold Value of Sweetness of Dextrose and Sucrose

Individual	Per cent Sugar Concentration 0.25	0.5	0.75	1.0	1.25	1.50	1.75	2.0
A				S			D	
B			S	D				
C				S	D			
D			S	D				
E							D	
F			S	D				
G			S	D				
H		S	D					
I			S	D				

S = Sucrose solutions
D = Dextrose solutions

Table IV—Comparative Sweetness of Sucrose and Dextrose Solutions

Concentration of Sucrose Solution in Per cent	Dextrose Solutions of Comparative Sweetness 100 per cent equivalent	75 per cent equivalent	66⅔ per cent equivalent
5	0	50	50
10	0	83	17
15	0	83	17
20	0	100	0
30	33	67	0
40	67	33	0
50	67	33	0



An inspection belt in plant of Fairmont Canning Co., showing shielded lighting arrangements.

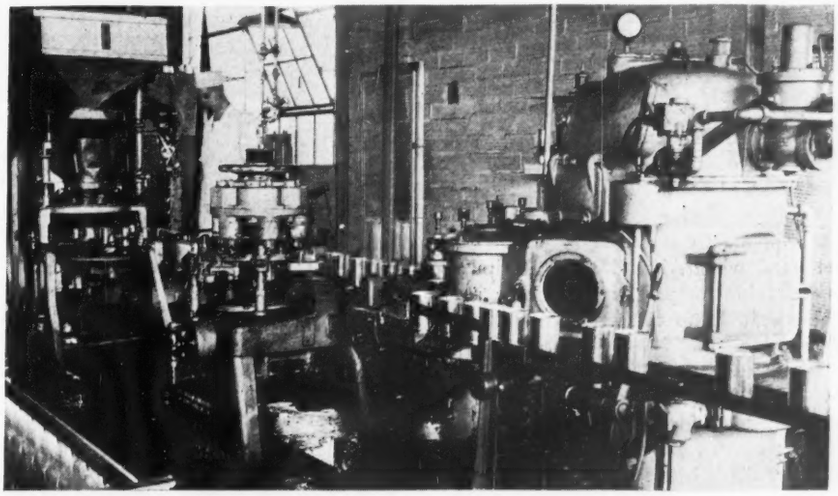
ture and a lower sweetness value which would not mask but enhance the flavor qualities of the product.

This improvement of flavor in canned products in which part of the sugar has been replaced by dextrose can best be appreciated by comparative tasting. In straight packs of fruit with sucrose sirup a distinct "harshness" and masking of the fruit flavor is discernible. In dextrose-sucrose packs the true fruit flavor predominates with a much "smoother" and not so objectionably sweet sirup. Of course this necessitates the proper ratio of dextrose to sucrose. In general with fruits, usually 25 to 50 per cent of the sucrose can be replaced by dextrose to give an improved flavored product. However, with some berries, such as raspberries, the amount of dextrose to produce an acceptable pack is very small. While, on the other hand, grapefruit segments packed entirely with dextrose have proven definitely superior to the sucrose pack. Dextrose tends to "firm up" such products as grapefruit and ripe fruit which may be too soft to otherwise hold its shape well. Table V shows the quantities of dextrose found suitable in experimental trials for various vegetables and fruits.

Also, with vegetables the proper ratio of salt, sucrose and dextrose blends will enhance the true natural flavor of the product. Usually a ratio of 1 part salt to 3.0 or 3.5 parts sugar will prove satisfactory in peas. Since the amounts of sugar and salt used by pea canners in various sections of the country vary considerably, it is more or less an individual canning problem to determine the replacement ratio of dextrose to improve the flavor satisfactorily. Usually a 25 per cent replacement can be made and even 50 per cent in some instances if consideration is given to factors disclosed in the first part of this article.

In these experimental cannings anhydrous dextrose which analyzed 99.5 per cent sugar was used.

Another distinct advantage of dextrose packs is the reducing properties of dextrose which retards the deterioration of the flavor of canned foods. Oxygen from the air which may be inclosed in the can or product when it is sealed is chiefly responsible for this loss of flavor. Dextrose definitely will aid in increasing shelf life. Previously, the shelf life of canned citrus juices was limited to a few months. Now with the use of dextrose in these juices the fresh canned flavor may be maintained 8 to 12 months or longer.



Filling and vacuum closing machines at Fairmont Canning Co. plant.

Table V—Percentage of Dextrose Found Acceptable in Canning Trials

Vegetables	Total sugar in brine Per cent	Per cent dextrose of total sugar Per cent
Beets	4	67
Carrots and Peas	3.5	33
Peas	5	25 to 50
Sweet Corn		
Cream Style	5	none
Whole Kernel	5	less than 10
Tomatoes	3	50 to 100
Tomato Juice	5	50 to 100

Fruits	Total sugar in sirup Per cent	Per cent dextrose in sirup Per cent
Apricots	40	33
Blackberries	40	25
Cherries (Red Pitted)	40	25
Grapefruit	5	100
Grapefruit Juice	5	100
Peaches	55	33 to 50
Pears	40	25
Prunes, fresh	40	33 to 50
Red Raspberries (Cuthbert)	50	25
Strawberries	60	none

Summary

During the past few years many industries have learned the advantage of dextrose in their food products. Experimental canning trials reveal more dextrose can be used with some products than others. This study ascertains the importance of several factors influencing the quantity of dextrose which can be successfully used in canned foods. Of these the acidity of the product as measured by the pH is of primary importance, followed by processing conditions and chemical nature of raw material and preserving medium.

The improved flavor of the fruits and vegetables packed with the dextrose-sucrose blends obtained by experienced trials indicates a possible means of enhancing the taste and the palatability over a longer period of time.

Bread Baking Test Suggested

Provides quick method for evaluating cake baking properties of soft wheat flours

By
J. A. SHELLENBERGER
Mennel Milling Co., Toledo, Ohio

ALTHOUGH the standard baking test of the American Association of Cereal Chemists (Cereal Laboratory Methods, 3rd Ed., Chapter V) is primarily intended for use with the hard wheat, bread type of flour, considerable helpful information on soft wheat flours can also be obtained by its use.

It offers several advantages over the cake baking procedure tentatively recommended for evaluating the baking properties of wheat flours even though soft wheat flours are not primarily suited for bread making. Among the most important advantages are the greater ease with which a series of flours can be baked into bread loaves than into a number of separate cake mixes; that dough characteristics can be observed to a better advantage during the mixing and fermentation periods; that the baked loaves possess internal and external physical characteristics which, in turn, can be interpreted in terms of the suitability of the flour for a specific purpose, based on or proven by results obtained when flours possessing similar properties are used on a production basis; and that experimental evidence indicates more opportunity for careful numerical scoring to differentiate between cakes made from various flours.

The possibilities that the bread baking test offers for use with soft wheat flours are significant in that correct evaluation of soft wheat flour is a problem of sizable economic importance. Over one-fourth of the total wheat produced in the United States

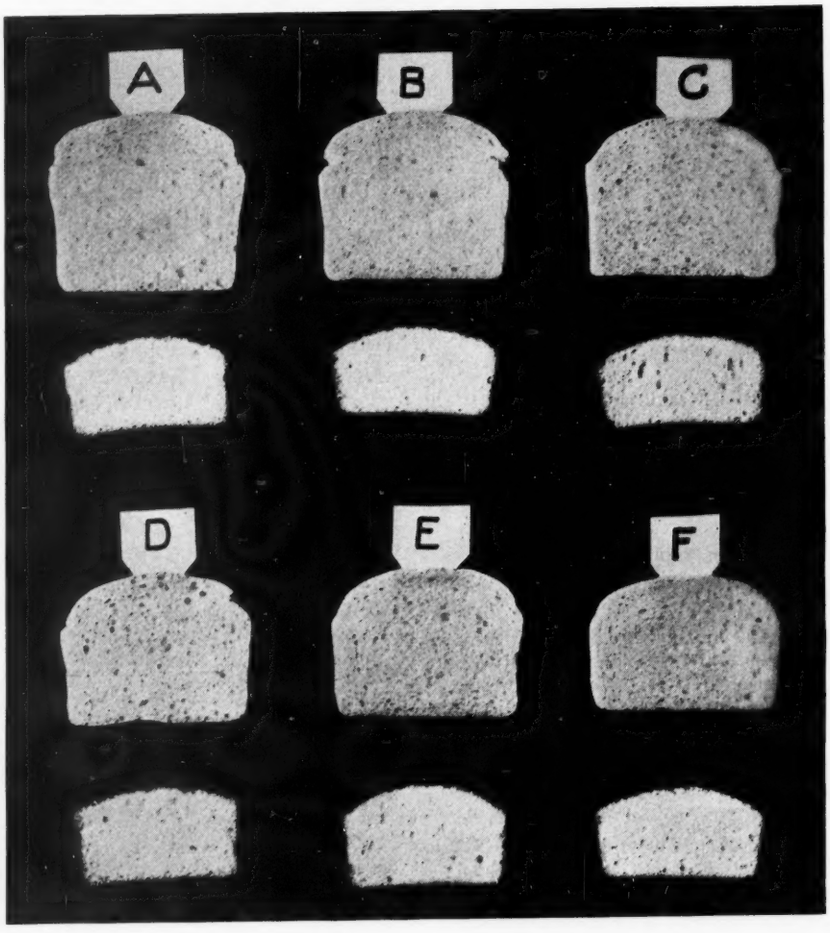


Fig. 1—Breads and cakes made from the same pastry flour permit two-way comparisons with breads and cakes made from other flours.

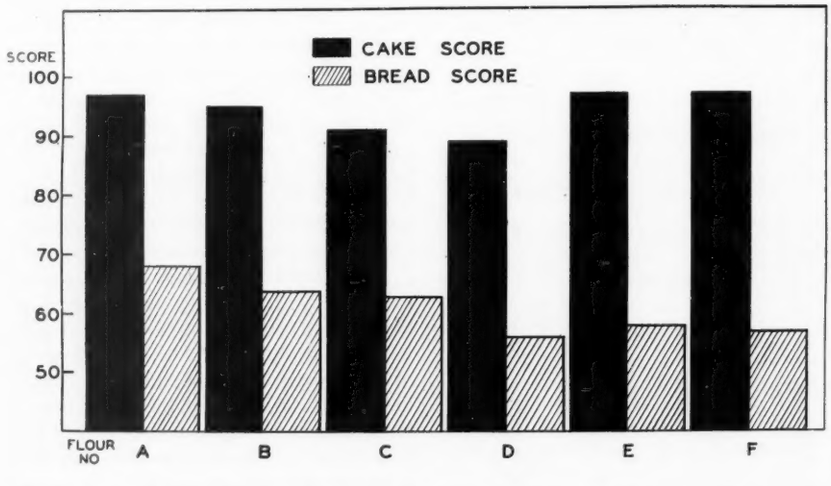


Fig. 2—Pastry flours giving cakes of high numerical score do not necessarily produce breads of same relative score rating yet the numerical score ratings of breads and cakes produced may indicate that the flours under test might be unsuited for use in either.

For Pastry Flours

This is an article on

QUALITY CONTROL

It is of interest to

Biscuit and Cracker Bakers

Cake Bakers

Doughnut Makers

Flour Millers

Pretzel Bakers

Pie Bakers

Because it suggests a rapid way of determining the relative properties of various soft wheat flours used in the manufacture of their products. By use of the standard bread baking test, good bread is not produced, but the details of the loaves made afford ample opportunity of differentiating between pastry flours.—The Editors.

is classified as "soft" and possesses physical and chemical properties which permit the making of various types of flour used widely in bakery products. These products are diversified and include crackers, biscuits, cakes, cookies, pies, doughnuts and pretzels. The variety of uses to which soft wheat flours are put makes advisable the use of as many trustworthy testing methods as possible for the evaluation of the flours in respect to baking properties.

For various explainable reasons, adequate methods for testing soft wheat flour properties have lagged behind those used for hard wheat flours in some respects. Heretofore the bread baking test has been considered unsuited for the evaluation of soft wheat flours, although of inestimable value for testing hard wheat flours. Part of this lag exists because the pastry type flour is used for such a wide variety of purposes that an attempt to designate relative quality on the results of any single baking test is certain to encourage misleading conclusions.

An ideal way to test any type of flour is to submit it to the same baking procedure as will prevail during commercial use. This "ideal" program is, however, difficult to accomplish and, if attempted, would be expensive, tedious, and time-consuming particularly when a flour may be used in a wide variety of baked goods. The problem becomes further complicated when a series of flours are being evaluated.

In the light of such complications results obtained by using a flour in the formula of one type of cake are hardly sufficient evidence on which to recommend or condemn its use in all types of cakes. Under an "ideal" program a thorough baking test of a cake flour would necessitate a trial bake of each of the three basic type cakes: sponge; pound; and loaf. In these cakes the flour requirements are frequently decidedly different depending upon the action of the leaven. Usually, if the leavening of the cake is dependent upon the introduction of finely dispersed air bubbles which have been beaten into egg whites, the flour used must produce a weak gluten structure in the batter. On the other hand, when chemical leavening agents are used the mix does not necessarily require the same delicate flour properties.

To the end of evaluating flours as to their baking properties the Ameri-

Fig. 3—Experience is a valuable asset in evaluating flours by means of baking tests regardless of the method used.

can Association of Cereal Chemists committees have done a great deal of very helpful work on the development of bread, biscuit and cake baking tests. These tests have been developed to a high degree of convenience and utility. And one must admit that testing a flour by use of the baking procedure most suited to the type of flour is a good policy as a general rule. However, testing a flour, regardless of type, by the bread baking method gives much helpful data.

The most frequent criticism of the bread baking test for pastry flours is based on the yield of small, unattractive loaves. But since the fundamental objective of test baking is presumably to appraise and differentiate, this objective can certainly be adequately accomplished without necessarily producing an alluring and eatable loaf of bread. The significant item from a testing standpoint is the ability to reproduce results consistently. In the past too much emphasis has been placed on the evaluation of loaf volume.

The fact that soft wheat flours do not produce voluminous loaves need not detract from the significance of volume relationships. But size of loaf should be only one of the many characteristics considered when judging bread. When the baking test is carefully conducted a multitude of prominent loaf details offers ample opportunity for differentiating between pastry flours. When the various external and internal characteristics are carefully graded one finds that the bread scores vary decidedly when different types of soft wheat flour are used.

In Fig. 1 is shown a series of breads and cakes from pastry flours which differed considerably in analysis, milling refinement and bleach, as well as in the grade of wheat used in their manufacture. In both cases the baking procedures were those developed by the committees of the American Association of Cereal Chemists. All six flours were air-dried to almost identical moisture contents before starting the comparative baking tests. The arrangement from "A" to "F" is in order of decreasing bread loaf volume. The chemical analyses of the six flours are indicated in Table I.

Fig. 1 evidences that there is as much, or possibly more, opportunity to judge and distinguish between the breads as between the cakes. This fact does not necessarily imply that the characteristics judged in the bread will be of value for predicting cake characteristics. In fact, the comparative cake and bread scores recorded in Table II and indicated graphically in Fig. 2 show that this assumed parallelism is not the case. Flour "F" produced a cake of high grade but, when "F" was made into bread, the score was only 57. Flour "D" was a cookie type flour, and both the bread and the cake made from it graded the lowest of the group. Flour "A", on the other hand, graded high by both baking methods.

Results of these tests do not indicate, however, that the value of the bread baking procedure for soft wheat flour is based upon the assumption that the test is an index to the cake baking properties of this flour. The bread baking test has its own merits because it can be made to yield characteristic internal and external features which in turn can be related to the cake baking properties of the flour. Once the bread baking characteristics of a pastry flour are established, this test can be used advantageously for checking the uniformity of the flour. This information is of particular value in flour mill control work because rapid and convenient methods for checking flour quality are essential.

For this reason, testing methods that can be depended upon to evaluate and to classify accurately these various types of soft wheat flour are urgently needed. With proper experience on the part of the user of the test either the cake making or the bread baking method can be used for quality control in flour mill or baking laboratory.

Experience is a valuable asset in work of this kind because neither a laboratory cake nor bread baking procedure can reasonably be expected to evaluate soft wheat flours unerringly for every commercial use. Laboratory information generally has to be interpreted before its full value can be utilized by the flour mill or the bakery.

Table I—Analysis of the Flours Used in Fig. I Breads and Cakes Expressed on 15 per cent Moisture Basis

Flour No.	A	B	C	D	E	F
Moisture	11.5	11.5	11.6	11.5	11.4	11.5
Ash	0.34	0.39	0.41	0.41	0.37	0.35
Protein	7.3	7.9	7.5	8.0	7.6	7.7
Viscosity	43.0	36.0	29.0	27.0	20.0	22.0

Table II—Comparative Score of Each Bread and Cake Baked From the Same Flour and Shown in Fig. 1

Flour Number		A	B	C	D	E	F
	Cake Scoring System						
External							
1.	Symmetry	10	10.0	9.0	9.5	8.5	10	9
2.	Volume	15	14.5	15.0	14.0	13.0	15	14
3.	Crust	5	4.5	4.5	5.0	4.0	5	5
Internal								
1.	Texture							
	(*a*) tenderness	15	15	15.0	14.0	14.5	14.5	15
	(*b*) silkiness	15	15	14.0	12.0	13.0	15.0	15
2.	Grain	25	23	23.0	22.0	22.5	23.0	24
3.	Color	15	15	14.5	14.5	13.5	14.5	15
Total Cake Score		**100**	**97**	**95**	**91**	**89**	**97**	**97**
	Bread Scoring System							
	Volume	20	15	14	14	14	14	13
	Shape	10	7	7	7	6	6	5
	Bloom	5	0	1	1	1	0	0
	Break	5	2	1	0	0	0	0
	Color	20	20	17	17	17	18	19
	Grain	20	12	12	11	9	10	10
	Texture	20	12	12	13	9	10	10
Total Bread Score		**100**	**68**	**64**	**63**	**56**	**58**	**57**

What Makes a World's Fair EXHIBIT Click

The dos and don'ts of exhibiting—based on results at the 1939 World's Fair

By IVAN C. MILLER
Distribution Editor, FOOD INDUSTRIES

Crowds gaped at Borden's boys playing nursemaids to a herd of cows. Study the faces in this picture. When your exhibit holds the attention as this exhibit did you have a "spell-binder"—a sure success.

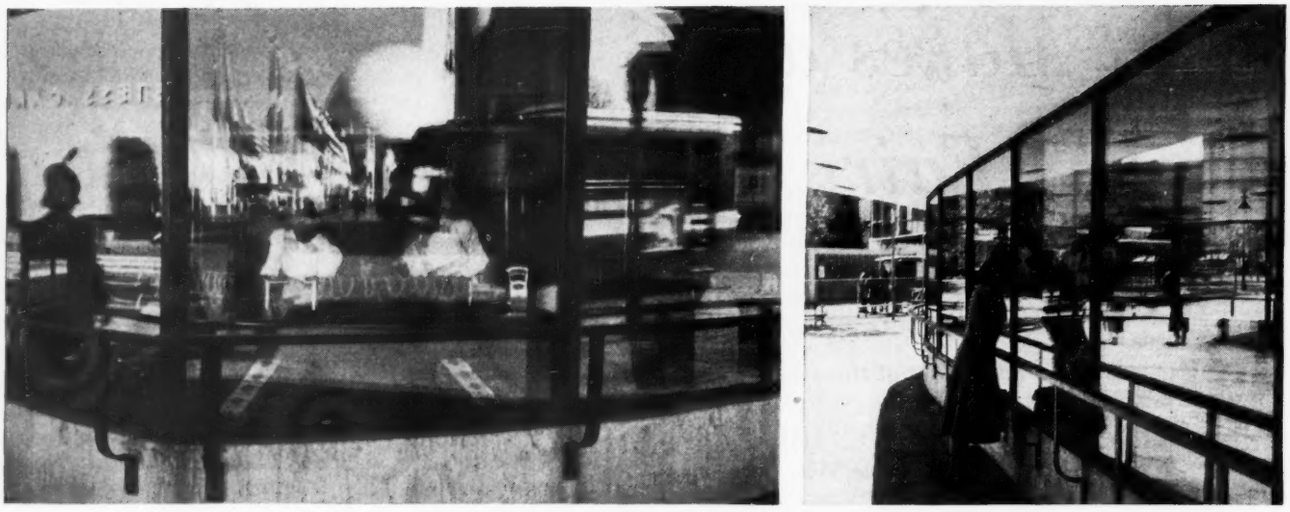
THE 1939 NEW YORK World's Fair might be called "The Great Competition". Approximately 1,600 manufacturers competed for the attention of 26 million visitors in a holiday mood, asking to be entertained. At the 1939 Fair, for the first time at a World's Fair, the "solid" exhibits overshadowed the amusements. They literally stole the show. What made the "solid" exhibits pull? Food manufacturers who exhibit at fairs, conventions or food shows, or who demonstrate in retail outlets, can learn valuable lessons from the successes and failures of the food exhibitors at the 1939 New York World's Fair.

Visitors identified themselves with the show when they tested their strength on Standard Brands' bicycle dynamometer.

Part II

THE 1939 New York World's Fair attracted 26,000,000 visitors, most of them with a basic interest in food. Food exhibits were popular. Food buildings were well attended. Why did some food exhibitors draw a major share of the attendance? Why did some succeed handsomely and others fail miserably? What were the effective appeals? What were the observable mistakes? How can last year's exhibit be improved? These are questions exhibitors are asking themselves. These are questions important to food manufacturers who exhibit—whether at fairs, conventions or food shows. The following analysis of fair exhibits indicates causes of failures, ingredients of success.

The Borden exhibit at the Fair, according to estimates, drew a larger portion of the gate than any other food exhibit. No matter from what angle the Borden building was approached, a hook was out to catch the crowd. Farm animals were the magnets. Farmers, the producers of food, with whom food manufacturers have an urgent need for better public relations, have a basic interest in livestock. They will flock to exhibits where there are farm animals. So,



Many Fair visitors missed an impressive exhibit because of the reflection of the glass front.

also, will almost everyone. People are attracted by animals. Food manufacturers, especially those whose products are produced from livestock, will find animals a sure-fire magnet for drawing crowds to an exhibit.

The Swift building, though housing strong exhibit elements, would have attracted a large crowd, had the exhibit included a menagerie of baby animals, pigs, lambs, and baby chicks. The Swift dog colony, had it been exhibited at the Fair, would have attracted a swarm of dog lovers and dog owners, prospects for Swift's dog food. Domestic animals will draw a crowd, and drawing a crowd is the first objective of an exhibit.

Food manufacturers have the advantage of one "pull them in" hook, which most other exhibitors lack. This hook is odor. The odor of food, especially food in preparation, stimulates a favorable reaction in most humans. Fair visitors flocked to the pressure cooker exhibits, when the demonstrator lifted the cooker lid and released the odors of a "just-cooked meal". The odor of baking bread attracted many of the 4½ million people who visited Continental Baking Company's exhibits. Also the odor of baking cookies drew visitors to the Drake exhibit and accounted for many of the 145,000 sales.

When the wind was right, the odor of wood smoke and curing hams directed passers-by to Swift's exhibit. And the aroma of roasting coffee kept a waiting line at Standard Brand's coffee bar. The odor of food in preparation attracts attention. However, not all exhibitors made full use of this simple inexpensive magnet.

Fair exhibitors, in planning a hook to "bring them in", should not overlook the building itself, especially if the building is the exhibitor's own. Westinghouse's building offered a strong invitation to come in and see. The glass front permitted passers-by to get a glimpse of "gadgets"—attendants in action—and crowds watching the show. The mirrored ceiling of the glass industry building reflected to the outside passer-by an intent crowd held by the drama of roaring furnaces and skilled artisans blowing glass. Borden's offered the passers-by the same two effective elements—crowds and action—action participated in by other human beings.

The crowd itself is the strongest magnet. To draw, the crowd must be seen by the traffic on the outside. A crowd collects where there is a show, and the best show has human actors. Standard Brands used the glass front on two wings of the exhibit building. Passers-by could see a crowd in one wing watching the demonstrators prepare Royal desserts, a crowd in another wing watching coffee roasting and a crowd sitting at the coffee bar.

At two entrances of the Swift exhibit, the glass front was used to attract the passing traffic to dramatic shows which illustrated how frankfurters are made and how sliced bacon is packaged. Attractive girls added drama and action to the show. Unfortunately, the reflection from the glass sides of the exhibit was so great that many visitors passed by without seeing the show behind the glass. When the glass front is used to permit passers-by to glimpse the show inside, means should be provided to prevent or remove reflections.

Once people are persuaded to enter an exhibit building, the problem the exhibitor then faces is how to hold them and convince them, and how to insure that they see all parts of the exhibit.

The Swift exhibit with three entrances and exits permitted visitors to enter and leave, unintentionally passing up at least one of the three important elements of the show. Some of the visitors at Standard Brands building entered only one wing of the building, saw only part of the attractions. On the other hand, every visitor who entered the utility building, the glass industries building and Continental Baking's exhibit had a chance to see the whole show. The difference was in the construction of the exhibit building itself. The latter buildings had but one entrance and one exit. Every visitor had to follow the crowd. This type of building arrangement provides an excellent opportunity to capitalize on the "herd instinct".

With traffic assured, the next problem is to hold the crowd at each element of the exhibit long enough to convince them. The best spellbinder is action—action which includes the human element. This action may be of two kinds.

Action in which the visitor participates was used in many successful exhibits. Visitors participated in exhibits at the Standard Brands building. In one display an optical device tested the participant's night vision, which is influenced by the amount of vitamin A present in the human system. Another attraction inviting visitors to identify themselves with the show was Standard Brand's bicycle dynamometer, which checked the visitor's strength in terms of

Grownups and children alike passed up National Biscuit Co.'s parade of dioramas to see a Mickey Mouse moving picture.

Dioramas attracted scant interest, even when the traffic flow was high. Beech-Nut's pulled and were best attended. Of the estimated 7¾ million people who visited Borden exhibits, less than 5 per cent took Borden's dioramas "in stride"—and these were mostly children. Children who watched Libby's show scarcely glanced at the diaromas, mechanical though they were. And the same youngsters passed up National Biscuit Company's parade of dioramas in their mad rush to see the same company's movie of Mickey Mouse.

Throughout the Fair there was evidence of both the attraction value and the interest value of the moving picture. Planters Peanut exhibit, which sold 190,000 customers, owes

slices of bread consumption per day.

Many exhibit elements, as well as whole exhibits, were built on the principle of audience and show. The human element made the show. When the "Pretzel Bender" at the Northwestern Yeast exhibit went into action, a crowd gathered, purchased pretzels. When the show was over the crowd melted, sales dwindled.

The counter in front of Mrs. Wagner's pie exhibit was crowded when the pie baker was performing, filling the ovens or removing hot pies. Pie eating customers were few between shows, mealtimes excepted. Interested groups watched men and women making and smoking frankfurters, and girls packaging Swift sliced bacon. They watched intently girl attendants operate machines forming ice cream bars and other girls who boxed Kraft-Phenix cheese. Crowds gaped at Borden's boys playing nursemaids to a herd of cows.

EXAMPLES of exhibits which successfully combined action and the human element were many. Unfortunately, however, some food exhibitors pinned hope on a static display. These exhibits, depending alone on pictures, models, dioramas or symbolic devices, proved to be varying degrees of "duds". The dud of duds was the focal food exhibit itself, an elaborate symbolic portrait of foods' functions in the life of mankind. The display included action, the mechanical action of symbolic forms—and a voice, a mechanical voice through a megaphone. Anyone who tarried long enough to observe the reactions of this exhibit on its few visitors was left cold and unimpressed as were the visitors themselves.

Continental Baking Co. let visitors see how Hostess cakes are made. Here is action, plenty of the human element and an interested audience who were convinced enough to buy almost a million packages of cakes.

Girls boxing packaged cheese as it came from the production line always had an audience.

these sales largely to the attraction of a foot square movie illustrating the life cycle of the peanut. The moving picture, especially the movie which shows "how it's done" deserves more use in exhibits.

Two other types of exhibit, the demonstration type and the sampling type, produced results. However, the results from both demonstration and sampling exhibits need qualifying. To be successful, a demonstration should be a good show—should include action and the human element. It should be short, informal and personalized. The small exhibits, where kitchen gadgets were demonstrated, attracted a large and interested audience. The demonstrator peeled potatoes and apples, corkscrew-sliced carrots and cucumbers, garnished salad plates and sold quantities of gadgets, many of which can be bought in the average dime store. George Rector cooked both plebian and gourmet dishes in the gas industries building, combined action and the human element with the sight, smell and taste of cooked foods, sold more than 50,000 cook books.

GENERAL FOODS demonstrated the preparation and baking of a cake and the preparation of a meal composed of Birdseye frozen foods. The demonstrators inclosed in a glass cage, addressed the audience through an amplifier. Those few who could get a place next to the glass inclosure remained for the demonstration. Total attendance was, however, small compared to that of other demonstrations, because only a limited audience could follow the show. Glassing in the stage robbed the demonstration of an intimate "jus' folks" atmosphere, and also shut off that important food exhibit asset, food odors.

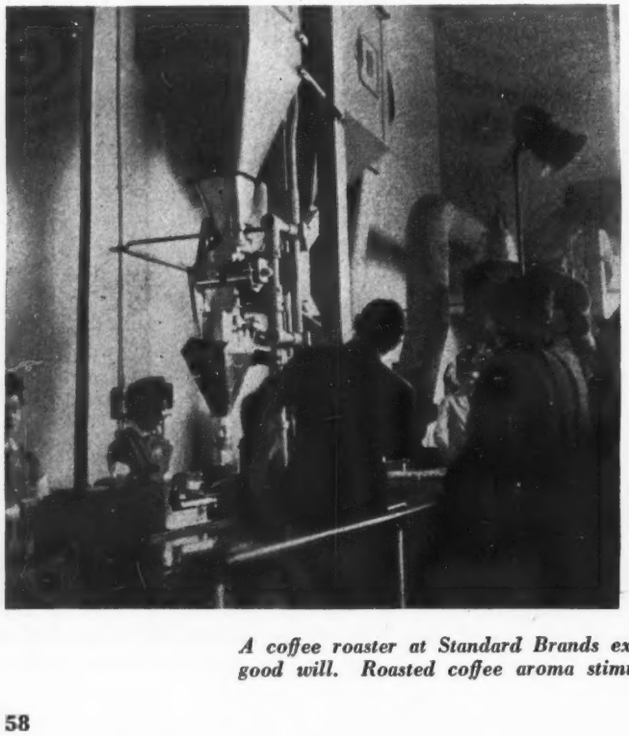
Visitors bought Mrs. Wagner's Pies when the show was on, especially when the hot pies were taken from the oven.

"Just sampling" will draw a crowd —a "hungry" crowd. In any great mass of people such as gathered at the Fair, there is "waste circulation". Included in the waste circulation are the "hungry ones", who mysteriously appear in line wherever there are free goods. Seldom will they listen through a demonstration in order to get the free goods. All they want is to be given and be off.

Each type of exhibit selects its audience. There are those in every large group with intellectual curiosity—call it mental hunger—those who are at least willing to listen and learn. And then there are those with just plain hunger. "Just sampling" is a magnet for the latter.

This does not condemn sampling, it merely minimizes the value of "just sampling." Chris. Hansen's Laboratories let the audience taste the fudge the demonstrator had made. This sampling, after demonstration was to give proof of the new product. Immediate purchases of the packaged product at the exhibit indicate the value of sampling after a demonstration.

There are times and cases where sampling is justified. However, there was much evidence at the Fair that "just sampling" may be an unnecessary expense. Approximately one out of every five people who went through

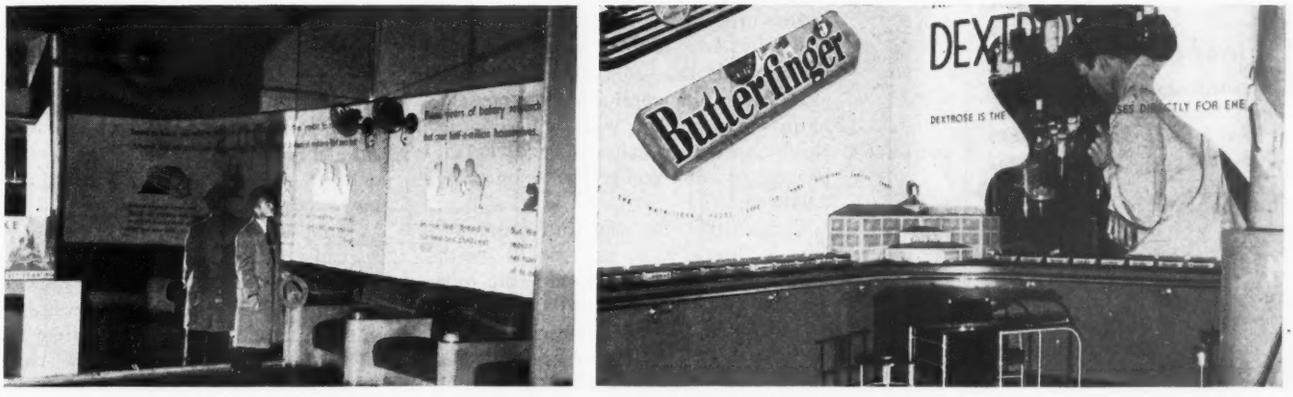


A coffee roaster at Standard Brands exhibit taught visitors "how it's done"—built good will. Roasted coffee aroma stimulated appetites, sold many cups of coffee.

A crowd gathered to watch the pretzel bender, melted when the show was over.

What better answer can the food manufacturer give to the doubts which have been raised, and are not yet explained away, than the simple proof of "how it's made"—"how it's done". And where better can this be demonstrated than where 26,000,000 people are gathered, asking to be entertained, willing to be sold an idea.

If those who have had doubts raised by well-known best sellers or similar agencies, could only visit a modern food plant, these doubts would evaporate in thin air. This of course is not possible. However, the modern food plant *can* be brought to the people at the Fair.



"Static" displays of pictures, models, dioramas, and symbolic devices need action and the human element to put them over.

Continental Baking Company's exhibit bought Hostess cakes, adding $45,000 to the till. This was sampling at no expense. Also it was sampling of a selected group of prospects. Fair visitors come to be entertained. They are not shoppers, yet they can be readily sold an idea. If they are sold on the product, they often buy the sample. One bought sample is worth many free to the "hungry".

Size alone was no measure of the value of a World Fair exhibit. What was done in the exhibit space determined results. Those exhibits which appeared to have accomplished best results, used the same formula. They combine action and the human element. They showed "how it is made". And thereby, they made a strong bid for better public relations. When the cost of a World's Fair exhibit is measured against the total advertising budget, it generally amounts to little more than pin money, yet the World's Fair offers to food manufacturers certain possibilities not offered by any regular advertising medium.

At the World's Fair, an exhibitor was above all else improving his relations with the public or failing as an exhibitor. This is more true of the food manufacturers than of any other group of exhibitors. Standard Brands' coffee roasting demonstration of "how it is done", coupled with the aroma of fresh roasted coffee, and the sampling (at the visitor's expense) earned more friends for Chase & Sanborn coffee than the elaborate puppet show trading on the prestige of the Charlie McCarthy program.

Food manufacturers should be aware of the need of improving their relations with the public. Food manufacturers have been dragged through the mud in print by a group of best sellers. They have been the target for the poisoned arrows of the many so-called consumer groups. They have long been silent to gross misrepresentation.

This situation is not unknown to food manufacturers. It is the subject of addresses and the basis of closed-session discussions at most of the conventions and meetings where food manufacturers gather.

The most successful food exhibitors at the 1939 World's Fair did just this. They brought the food plant to the people and they built for themselves much good will with the public. They also raised the level of the food industries in the public estimation. Though they have made a start toward restoring the good will of the food industries, their efforts alone are not enough.

There is need for more of this type of good-will-building exhibit. FOOD INDUSTRIES recommends participation in the 1940 World's Fairs, in New York and San Francisco, to all food manufacturers who are able to present to the public a well-prepared and effective exhibit, showing how their products are made or used. There is no less expensive way to make a quick, nationwide improvement in food industry public relations.

EDITORS NOTE: The Swift & Co. exhibit which appeared at the Fair was the result of emergency last-minute changes in plan of building design and type of exhibit. It should be noted that although in this article several weaknesses of the composite exhibit have been pointed out, nevertheless the Swift building contained some of the best showmanship elements of all exhibits at the Fair.

Fats and Oils Battle For Food Industries Market

Technical, economic and political weapons used in competitive struggle influence the choice of fats and oils for food manufacture and determine their availability and price

This is an article on

RAW MATERIALS

It is of interest to makers of

Bakery Products
Dairy Products
Fishery Products
Margarine
Meat Products
Nut Products
Salad Oils and Dressings
Shortenings
Vegetable Oils

Because it deals with the many economic, technical and political factors that affect the price and availability of various fats and oils, which are among the most important of all food raw materials.

—The Editors

By GORDON W. McBRIDE
Chemical Engineer, Washington, D. C.

COMPETITION of fats of oils with each other is economic and technologic, political and perpetual. Vegetable oil shortenings compete with lard, edible fats and oils compete with inedible, margarine competes with butter, and importers compete with domestic producers. Certainly a more rapidly shifting situation could not be imagined than exists for these commodities.

Let us examine some of these fundamental factors one at a time, to ascertain their individual effects on the ever-changing food fat situation. Such a method demands that all variables but one be eliminated from consideration momentarily; then the conclusion is justified that "Other things being equal, thus is so". The fact that "other things" never stay equal only means that in actual practice all factors must be considered simultaneously in their mutual interrelations. However, if the individual effects are more clearly understood than is generally the case, it will be easier to reach sound conclusions when all phases of the competition must be balanced.

Competition for the ultimate market is literally a free-for-all, with butterfat, lard, vegetable fats and oils, and the inedible fats and oils as the participants. It is a four-sided civil war, with temporary coalitions sometimes swinging the tide of battle one way, sometimes another. As technology adds new oils, the interaction of raw materials on each other upsets the equilibrium, or at least shifts the balance point to a new location.

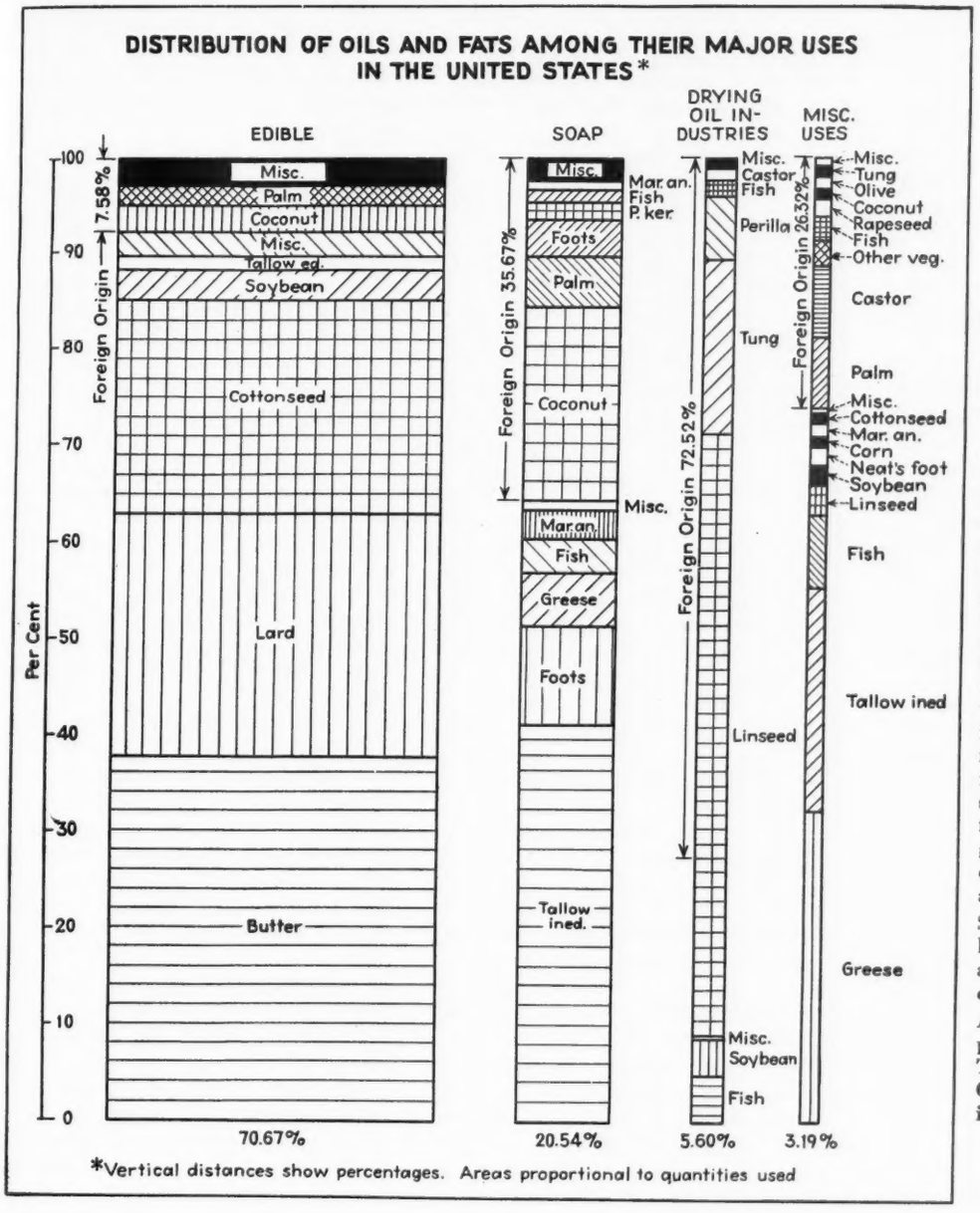
In all cases the ultimate decision as to which fat or oil to use is based upon economic considerations; but only rarely is this unclouded by technologic and political preliminaries. In the simplest case, there is merely the question: "Does one oil cost more or less than another oil, in cents per pound delivered?" This assumes that the two oils are identically interchangeable in the process for which they are being procured. Since two oils are but rarely identically interchangeable, the question becomes a little more complicated: "By treating one oil in a certain way, costing so much per pound, will it be as cheap as another oil which costs more but requires no treatment? In this way, the influence of technology usually appears with the economic question.

And similarly, politics affect the economic decision in many cases: "One oil which must be imported costs less than another domestic oil, but is there any reason to believe that the import duty or excise tax on the former oil might not be raised to make the entire process uneconomic?" Of course, politics need not be international to affect the fats and oils produced domestically, but that phase of the subject will be taken up later.

Table I—Production of Domestic Fats and Oils

The outstanding recent advances in domestic oil production have been in peanut oil and soybean oil. These advances are the result of increased attention to oil yield, as well as increased crop acreage. Diversion of peanuts from the nut market to the oil market has also been accelerated by partial subsidy of the Agricultural Adjustment Administration. The recent increase in domestic production of marine oils took place as a result of the excise and processing taxes imposed on imported fats and oils which are not products of American fisheries, and easing of restrictions on fishing in territorial waters. The sharp decreases in 1937 production of lard and linseed oil reflect the droughts of the preceding years. Data from the Department of Agriculture.

	1929	1931	1937	Nine-year Average (1929-1937)
	(Millions of Pounds)			
Butter	2,159	2,197	2,132	2,190
Corn Oil	134	113	127	119
Cottonseed Oil	1,584	1,417	1,626	1,430
Grease	387	364	301	329
Lard	2,598	2,385	1,434	2,105
Linseed Oil	321	364	84	206
Marine Oils	116	65	268	172
Neats-foot Oil	6	4	6	5
Oleo Oil	123	94	75	92
Olive Oil	1	2	2	2
Peanut Oil	16	14	51	33
Soybean Oil	11	39	194	77
Stearin (Edible)	60	47	44	45
Tallow (Edible)	44	70	78	66
Tallow (Inedible)	535	587	685	595
Wool Grease	10	9	8	8
	8,105	7,771	7,055	7,474



This chart shows that consumption of oils and fats in edible products exceeds all other uses of oils and fats combined. The paint maker is relatively more dependent on imported oils, although he imports less than the food manufacturer on a tonnage basis. The soap maker is the largest importer of fats and oils, principally because of his need for coconut oil, essential for its lathering properties. Consumption of butterfat in fluid milk, cream and other dairy products except butter is not included in this chart. Such items as milk, cheese and ice cream are not usually bought for their butterfat content and, therefore, do not compete directly with other fats and oils. The total consumption of butterfat in all forms is nearly 2½ times as great as the consumption indicated on the chart for butter alone.

Source of Data:—Reports issued by U. S. Bureau of the Census and U. S. Department of Agriculture.

Above chart duplicates chart appearing on page 90 of "The Tariff on Animal and Vegetable Oils" published by the Brookings Institution.

Classification

Fats and oils are usually classified by use under four general headings: edible, soap, drying, and miscellaneous. With a few notable exceptions any of the fats and oils may be consumed in the edible field, but because of price or some particularly desirable properties other fields usually account for the final disposition of certain ones.

The domestic fats and oils are primarily edible. This is very fortunate, because food use of the edible fats and oils represents nearly three-quarters of their total domestic consumption. As a matter of fact, this country is more than self-sufficient in respect to edible fats and oils. It is normally on an export basis.

In round numbers, one-third of domestic production of edible fats and oils is in the form of butter, another third is in the form of lard, about one-fourth is cottonseed oil, and the balance is made up of oils from corn, soybeans, peanuts, and minor edible animal fats. Normally, between 5 and 10 per cent of the consumption of edible fats and oils is imported. The fact that any oil is imported for edible consumption is based either on consumer preference (olive oil) or on economic justification, usually temporary (butter, in drought years). In no major instance is the imported oil essential to the domestic food supply.

Domestic production of inedible fats and oils is led by tallow and grease, byproducts of the meat packing industry, with marine oils closely following. In the aggregate, American production of inedible fats and oils is roughly comparable with cottonseed oil in quantity, or about 20 per cent of total U. S. production of all fats and oils.

Those vegetable oils and oilseeds which are imported to the greatest extent (practically no animal fats are imported) are coconut oil (and copra) palm oil, flaxseed (linseed oil), tung oil, and olive oil. Total imports normally are approximately 25 per cent of the usual domestic production. Coconut oil is a very important raw material in the soap industry, but it is also used to advantage in margarine when the price will permit competition with cottonseed oil. Palm oil is used principally in soap and vegetable shortenings, while small quantities also go into the tin plate industry. Linseed and tung oils are

used predominantly in paint, varnish and synthetic resin manufacture, and incidentally for a few other miscellaneous inedible applications. About 60 per cent of the imported olive oil is edible, and about 95 per cent of the edible oil is consumed "as is", as a salad oil. The inedible olive oil goes principally into soap manufacture and into the textile industry.

Two Types of Economic Competition

Consider the economic competition of fats and oils with each other neglecting for the moment the factors which may have determined the present prices. Lard and butter at one time were practically unchallenged in the edible field. Now the hydrogenated vegetable oil shortenings claim about half the total shortening market; and margarine, though held in check politically, has long threatened the commanding position of butter. Margarine can be made much more cheaply than butter; and for the average consumer can be made nearly indistinguishable from butter, when skillfully compounded. The food value of the two is comparable, so that, if restraining taxes and regulations were lifted, the main sufferer would be the butter manufacturer, unless the total consumption of edible fats should rise.

Similarly, vegetable oil shortenings can under-sell lard when the price of cottonseed oil is low, or hogs are scarce, or both. Dietetically, there is small difference between the two shortenings and the average consumer neither knows nor cares whether his pie crust was made with lard or with manufactured shortening. The choice is usually the baker's and is likely to be most influenced by the relative prices of the two fats and the purveyor's persuasive powers.

These two battles have one point in common, and another point in contrast: Both margarine and the vegetable oil shortenings are manufactured products, originally sought and developed to take the place of natural fats. The contrast lies in the methods of publicizing the products—really a lesson in psychology: Margarine, introduced in the latter part of the nineteenth century, was described as a "substitute" for butter. As such it acquired an inferiority status that simply invited discrimination and the "protection" attack.

The vegetable oil shortenings, on the other hand, have been offered to the consumer at relatively high prices as an "improvement" over lard. This claim has served to stimulate improvements in the processing of lard, so that today competition is more nearly a price comparison. From the technical viewpoint, "just as good" (margarine's claim) and "better" (shortening's claim) is largely a case of distinction without difference.

The day is not far distant when butter will also feel the competition of the vegetable oil shortenings. The new "high-ratio" shortenings, recently perfected and introduced to the baking trade, are enabling the baker to produce cakes which are actually better than home-baked cakes. (See FOOD INDUSTRIES 9, 14, 1937.)

Another interesting example of reported economic competition is that between Manchukuan soybeans and domestic beans. The oil from either source can completely and satisfactorily replace the oil from the other source. Yet the Manchukuan beans have been bought in at least one European country in preference to American beans because the protein content of the Manchukuan bean is higher, and the protein content has been the basis for contract. The by-product value of high protein meal has governed the choice. This is true despite the fact that oil from the American bean is slightly superior in quality. Thus byproduct and co-product economics affect the fats and oils competition and may even determine important market choices and prices.

Other examples of fundamentally "economic" competition can be shown in the choice between bean oil and cottonseed oil for the vegetable oil shortening manufacturer, between coconut oil and cottonseed oil for the margarine manufacturer, between grease and tallow for the soap manufacturer, between linseed oil and perilla oil for the paint manufacturer, and so on.

Table II—Imports of Foreign Fats and Oils, Including Oil Equivalent of Seeds, Nuts, Etc.

About 90 per cent of these imported oils are of vegetable origin. Many reach the United States as seeds or nuts and are processed in the United States; the figures shown include the oil equivalent of such import. Most of the non-vegetable oils are of marine origin. The variation in quantities of various oils imported depends importantly on United States crop conditions. For example, the import of cottonseed oil and corn oil in 1937 was a result of the 1936 drought, and represented an effort to supply the shortages otherwise occurring in corn oil and corn-produced lard. Babassu oil first imported in 1935 has now acquired industrial importance. It is a non-drying oil, about two-thirds of which was used in 1937 for edible products; the balance was used in soap as a cocoanut oil substitute. All data from the Department of Commerce.

	1929	1931	1937
	(Millions of Pounds)		
Babassu Oil	.....	.....	35
Castor Oil	79	46	66
Coconut Oil	777	618	681
Cod-liver Oil	21	13	44
Corn Oil	.....	.....	33
Cottonseed Oil	.....	.....	194
Linseed Oil	477	284	550
Olive Oil (Edible)	97	70	48
Olive Oil (Inedible)	56	49	27
Palm Oil	262	274	451
Palm kernel Oil	70	23	128
Peanut Oil	3	15	58
Perilla Oil	35	13	44
Sesame Oil		61	5
Soybean Oil	20	6	30
Tung Oil	120	79	175
Whale Oil	55	140	55
Animal Oils and Fats, not otherwise specified	30	13	24
Fish Oils, not otherwise specified	59	37	23
Vegetable Oils, Fats, and Waxes, not otherwise specified	101	77	141
Total	2,262	1,818	2,812

Political Competition

Political competition is the unpredictable factor in the fats and oils problem, and it is not confined to local or even domestic politics. The recent outbreak of hostilities in Europe has accentuated some of these international "political" factors in the normal competition.

For example, Britain, France, Germany, and most other European countries have fixed the prices of most fats and oils, and have prohibited or at least restricted their export. Even in peacetime the totalitarian countries had major restrictions on these commodities that were certainly as political as could be imagined. The belligerents now regard edible fats and oils as contraband and eye with suspicion the shipments to almost any European nation, feeling that the ultimate destination might be an enemy food supply. The effects of reduced shipping facilities available and increased freight rates have already been felt in prices of oils which are imported into the United States.

It need not be emphasized that there are effective political barriers to importation of fats and oils at the boundaries of the United States. The excise and processing taxes now in effect on the various animal, fish, and vegetable oils and oil-bearing substances are the results of the Revenue Acts of the Congress, in 1934, 1936, and 1938. No expiration date has been set for these taxes, so it may well be assumed that they represent a relatively permanent addition to our tariff policy. The commodities affected and the total amount of the taxes are, however, subject to variation from time to time.

An interesting sidelight on the 3 cents per pound excise tax is provided by the present whale oil situation. Although the products of American fisheries are exempted from this tax, it happens that the United States whaling industry employs Norwegian

Table III—Fats Consumed in Bread and Other Bakery Products

The baking industry appears to use about 10 per cent of the food fats, being the largest of the edible oil and fat customer industry groups, outside the dairy products industries. The increase in total fat use reflects general growth in poundage of product baked. The shift from lard to other fats is also notable.

	1923*		1929		1931		1935		1937	
	(Millions of Pounds and Dollars)									
	Lb.	$	Lb.	$	Lb.	$	Lb.	$	Lb.	$
Butter, oleomargarine, and other butter substitutes	33	13.4	50	16.0	48	10.4	40	9.7	56	13.3
Lard	271	35.2	253	30.9	220	19.5	140	18.9	176	21.2
Other shortenings	118	16.1	260	32 3	241	22 1	339	41.1	442	52.6
Totals	422	64.7	563	79.2	509	52.	519	69.7	674	87.1
Average Cost to Baker	15.3¢/lb.		14.1¢/lb.		10.2¢/lb.		13.4¢/lb.		12.9¢/lb.	
Value of Products of establishments which reported materials used (millions of dollars)	1,123		1,385		1,015		1,064		1,353	
Fat cost in per cent of Value of Products	5.76%		5.72%		5.12%		6.55%		6.44%	

* In 1923 the Census of Manufactures first reported in detail the specific materials consumed in this industry. The 1923 figures are Census estimates for the entire industry, based on returns from establishments reporting slightly over 80 per cent of the total value of products. For that year, oleomargarine and other butter substitutes were included with the "other shortenings", not with butter as they have since been reported.

killer ships and crews. Unfortunately for the United States whaling companies, the oil from whales killed by Norwegian gunners is not now under the law "the product of an American fishery" even if the whales are cut up and boiled on factory ships flying the American flag.

The Tariff Factor

Fundamentally, tariff protection is justified "to maintain the American standard of living". Demand for protection comes when a producer suddenly finds that somewhere else in the world someone can produce cheaper, or perhaps better than he does for the same price. To meet such competition the producer must cut his costs, and when the material and operating costs are at a minimum the only place left to cut is in the return to the producer. If he is unwilling or unable to live on a smaller return, that is, at a lower standard of living, he loses his business.

However, when a tariff is put on some commodity which is not produced within the country (coconut oil in the United States, for example) yet which is absolutely indispensable to some industry in that country (the soap industry, for example), the normal philosophy of tariff protection is being ignored to the detriment of industry and at the expense of all ultimate consumers.

It is only with the greatest difficulty that export trade and high tariff protection can be maintained by the same country. The one demands selling goods abroad and the other refuses to buy goods abroad. Such a plan will work for a while, but foreign money and demand soon disappear. That this fact is recognized is evident from the subjects considered in Trade Agreement negotiations, e.g., Uruguay. The list of products on which the United States considered granting concessions to that country included flaxseed, linseed oil, tallow, and oleo stearin.

Price fixing, export subsidy, barter plans, and even degrading of edible fats and oils to inedible, have been suggested recently as political panaceas, but none offers stability or a permanent solution to the problem.

Local and domestic politics are perhaps the most annoying (to food men) and the least predictable as to the effect on the movement of fats and oils. Certainly they may be also the most damaging to the national economy, in that the usual outcome is to "rob Peter to pay Paul". One section of the country is aligned against another—for example the Southern cotton growers against the Middle-Western dairy and livestock men—with Congressional effort directed at getting the most for the respective voters back home, one group competing with the other. As long as a Congressman's political life depends on his getting what his constituents want, and his constituents want a bigger piece of pie than some other Congressman's constituents, there will be political competition between all competing fats and oils which are raised in different parts of the country.

The latest factor to be injected into the fats and oils competition by domestic politics is the Federal Food, Drug and Cosmetic Act. One of the requirements of this law is label declaration of the common or usual names of all the ingredients of a food which "is fabricated from two or more ingredients". By a ruling from the Food and Drug Administration, a product like Crisco or Spry may be termed a "Hydrogenated Vegetable Oil Shortening" without further details of the composition because the entire formula is blended before hydrogenation to the desired consistency. Another shortening, however, might have the same consistency, and yet be a blend of completely hardened cottonseed oil and unhardened palm, peanut, and soybean oils. In this case the label would declare that the shortening "contains hardened cottonseed oil and palm, peanut, and soybean oils", listed in the order of quantities used. That type of shortening may suffer at least inconvenience as formulas change to follow market fluctuations.

Part II of this article, appearing in April, will deal with technologic competition and research in fats and oils.—The Editors.

CORRECTION

Please paste the table given below in your January, 1940, copy of Food Industries, on page 38, over the table appearing at the top of that page. You will note that the column headings, as given originally, were incorrect.—The Editors

Scott. p. 400			A. Hurst and Co.	Insect material	Minimum length in mm.	Minimum width in mm.
Cloth #	Length aperture in mm.	Number threads per in.	Meshes per lineal inch			
5XX	0.265	66	66			
6XX	0.230	73.6	74	(after Larvae Good)	0.863	0.193
7XX	0.195	81.3	82			
8XX	0.180	87.4	86	Larval excreta	0.066	0.058
9XX	0.150	97.8	97			
10XX	0.125	110.2	109	Larval casts	0.083	0.025
11XX	0.115	117.8	116			
12XX	0.105	127.0	125	Adult excreta	0.116	0.058
13XX	0.095	133.6	129			
14XX	0.085	141	139	(after Egg Good)	0.476	0.257
15XX	0.075	149.3	150			
16XX	0.070	153.9	157			

Performance Data Determined For New Food Freezing Plant

System involves innovations. Designed for high quality operation

This is an article on

QUICK FREEZING

It is of interest to processors of

Vegetables
Fruits
Fish
Meat
Poultry

Because it presents operating data on freezing which are not readily obtainable elsewhere, and it discusses innovations which help to attain higher quality and to save labor.—The Editors.

Part I

By WILLIAM J. FINNEGAN
Consulting Engineer, Los Angeles, Calif.

TO meet the increasing demand for high quality frozen foods, John H. Dulany & Son, Fruitland, Md., has installed new freezing equipment at its Exmore, Va., plant. Certain innovations were made in the design of the new plant to combine sanitation and flexibility with economy in production.

The freezing equipment is a multi-stage tubular freezer, installed by Baker Ice Machine Co. It includes freezing tube adapters which permit quick freezing in packages as well as individual freezing of loose or bulk materials. The line of products to be frozen is large: peas, asparagus, wax and green stringless beans, lima beans, spinach, broccoli, brussels sprouts, peaches, strawberries, raspberries, blackberries, huckleberries, crab meat, soft shell crabs, fish, oysters, chickens, ducks and turkeys.

On the Delaware-Maryland-Virginia peninsula, adjacent to an adequate raw supply of all the foregoing foods, the plant is so located that only short hauls of raw materials are needed. This permits close supervision over raw material quality, an important factor in quality control. More important from the viewpoint of costs, however, is the wide variety of materials and their diversity in season of production. This affords an even distribution of the freezing load over approximately eleven months of the year. And that, in turn, presents a very economical operating load factor.

In general, the initial processing of the foods prior to freezing—such as washing, grading and blanching—and the storage practice after freezing conform to accepted practice. There is one exception, however. Careful study has revealed the proper balance of mechanization against manual labor. It has shown where quality may be lost by the former and gained or retained by the latter.

Reduction of the amount of hand labor by mechanization has been proved to be capable of definitely adverse effects on quality of the finished frozen product; and, because a high quality standard is to be maintained, the Dulany plant employs an unusual amount of labor. To illustrate: To produce 1 ton per hour of individually frozen products, such as lima beans, approximately 50 women and 160 sq.ft. of inspection belt area are employed in the final inspection.

Compensating for such liberality where it is needed are certain labor economies such as the use of cold water flumes for simultaneous precooling and conveying of individual produce to the tray filler. After the produce is put into trays, it is promptly moved into the freezing tube. This setup not only lowers the temperature of the raw material, but effects a saving in labor cost.

The freezer is housed in a hermetically sealed casing, and has ten stages for accelerating the transfer or exchange of heat from the product to the secondary refrigerating medium, chilled air. One is a precooling stage, eight are freezing stages and one is a produce tempering stage. A total of twenty air cooling units are employed, arranged so that air is cooled

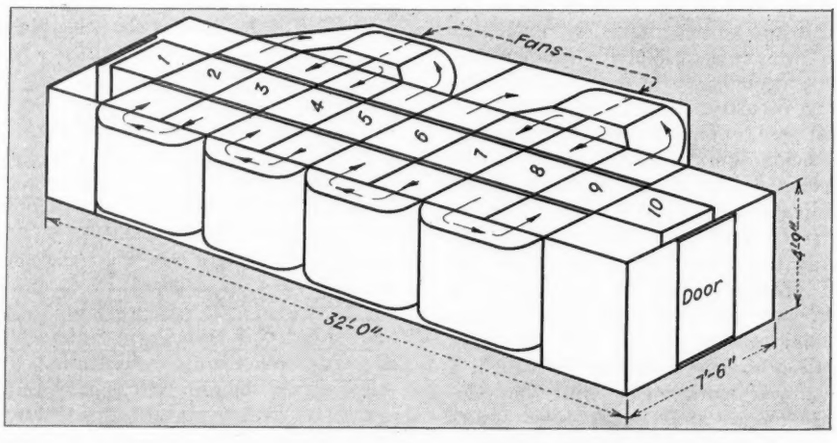
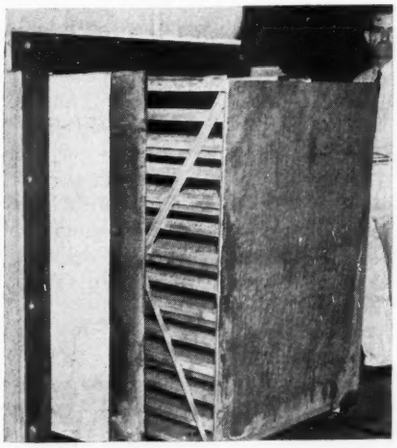


Diagram of ten stage air blast freezer at plant of John H. Dulany & Son. The freezer consists of a sealed casing with one precooling stage, eight freezing stages and a tempering stage. Twenty refrigerating units are employed, two to each stage.

To maintain a high standard of quality, about 50 women and 160 sq.ft. of inspection belt area are employed in the final inspection of one ton per hour of frozen produce at the Dulany plant. But labor saving devices are used, too. One is the cold water flume which simultaneously precools and conveys the product from inspection belts to tray filter. Note flume at discharge end of belt.



Truck with frozen lima beans being automatically discharged from tube of Finnegan air blast freezer in Dulany plant. In the freezer, refrigerated air blows over the trays, passing between the metal plates on the front and back of the truck.

at two points in each compartment or stage.

Overall outside dimensions, excluding fans, are: length, 32 ft.; width, 9 ft. 2 in.; height, 4 ft. 9 in. A total of 1,965 cu.ft. of space is utilized to accommodate the entire freezing apparatus, including the fans and housing. Approximately 65,000 cu.ft. of air is divided into four separate air streams and recirculated each minute. Each air stream is cooled in four separate stages during its 14 ft. travel in each circuit.

Designed freezing capacity is 4,000 lb. per hour while the freezer is operating at a 15 lb. ammonia suction pressure; or 7,500 lb. per hour while operating at a 5 lb. suction pressure. These computations were based on individually frozen products such as peas and lima beans. This design provides for the freezing of 3.3 lb. or more, of produce per hour for each cubic foot of building space occupied.

Tests were made under actual commercial operating conditions to determine accurately the performance of the equipment. Freezing lima beans at high temperatures, the following data were obtained:

Conditions:

Wet beans were arranged on trays, approximately 4 lb. per square foot of tray area.

Initial temperature of beans	65 deg. F.
Final temperature of frozen beans	2 deg. F.
Ammonia pressure at freezer	15 lb.
Corresponding ammonia temperature	−1 deg. F.
Air temperature in first stage	20 deg. F.
Air temperature in final stage	½ deg. F.
Average air temperature of all stages	10 deg. F.

Results:

Time required to freeze beans	48 min.
Capacity of freezer, in lb. per hour	5,250

Compare the above figures with the data below, pertaining to freezing lima beans at low temperature:

Conditions:

Wet beans were arranged on trays, approximately 3½ lb. per square foot of tray area.

Initial temperature of beans	65 deg. F.
Final temperature of frozen beans	−10 deg. F.
Ammonia pressure at freezer	6½ lb.
Corresponding ammonia temperature	−14 deg. F.
Air temperature in first stage	7 deg. F.
Air temperature in first stage	7 deg. F.
Average air temperature of all stages	−5 deg. F.

Results:

Time required to freeze beans	22.4 min.
Capacity of freezer in pounds per hour	7,704

Power consumption figures are not available because the refrigeration is purchased from a neighboring cold storage plant. The cost advantage of high temperature compared with low temperature freezing can be computed from the principle that an overall power saving of approximately 1 kw.-hr. is effected for each 1 lb. increase in suction pressure per ton of frozen food produced within this temperature range. Also important is the fact that the compressor capacity is increased approximately 3 per cent by each 1 lb. increase in suction pressure.

Prior to the installation of one of the innovations in the Dulany plant, clusters of frozen beans, peas and other products were broken up by hand. But a new mechanical separator, for which patent applications are pending, accomplishes the separation in such a manner that: (1) The labor required for adequate separation was reduced approximately 80 per cent; (2) the time required for the operation was greatly reduced; (3) injury to the produce was reduced by approximately 75 per cent. To determine the effect of separation, in amount and extent of abrasion, cooking tests were made, these being followed by minute examination on both hand separated and mechanically separated frozen beans.

Tests were also made to determine the amount of dehydration due to freezing. Henderson lima beans were arranged on trays, approximately 4 lb. per square foot of tray area. All beans were taken from the water flume which conveys the produce from the inspection belts to the tray filler. The beans were thoroughly wet, but the excess water drained from beans and trays as the freezing racks were filled.

Several racks of empty wet trays were conveyed through the freezing tube to determine the amount of moisture loss from the trays. The trays were carefully weighed before entering and immediately following the discharge of the trays from the freezing tube. Numerous trays with a normal load of wet beans, including several full racks, were carefully weighed before entering and immediately following the discharge of the full trays and racks from the freezing tube. The dehydration of the product, based on loss of weight due to frezing, averaged 41/100 of 1 per cent.

Part II of this article will be published in an early issue of FOOD INDUSTRIES. *It will present practical operating data and information on freezing poultry, on freezing packaged produce and on defrosting freezing equipment.*—THE EDITORS.

Hints and Hurdles

Big Guns and Little Guns

AFTER the Federal Surplus Commodities Corporation's stamp plan had been in operation in Rochester for a matter of months, Rochester banks slapped on a service charge of five cents per stamp card cashed, effective date December 1. For a time it looked as though a monkey wrench had been thrown into the stamp plan machinery. If this first pot shot proved effective, Federal Surplus Commodities Corporation could hope for little else than a barrage from other sources as well as banks in the many cities where the plan is soon to be in operation. The five cent service charge plan has been withdrawn. Now all is peaceful in Rochester. The bankers have lowered their sights. It would be interesting to know whether the long range guns trained on the Rochester banks at Washington, or the numerous close range guns of wholesalers and retailers in Rochester, brought an end to hostilities.

Yankee Medicine for Food Industries

FOR SEVERAL DECADES business and industry have been trekking out of New England into other parts of the country. Behind them they have left millions of empty square feet of factory buildings. This migration toward the source of raw materials, cheap labor and more advantageous geographical locations has been generally accepted as heralding the doom of the Yankee States' prosperity.

The six New England States faced their shrinking market, decided the problems were too great to be licked by any one state. They formed the New England Council. The migration has not only been checked but new industries are moving into the New England States.

The food industries may profitably learn a lesson from the experience of the New England Council.

Many of those who supply a part of the nourishment of the nation consider themselves not as a part of the food industries but as separate industries. It is not one of the food industries which supplies meat to the nation but the meat packer. It is not a unit of the food industries which provides bread, cheese, canned foods and confections, but rather the baking industry, the canning industry, the cheese factory and the confectioner. Yet all supply food to the same consumers through the same institution or the same retail outlets. All face many common problems demanding solution.

Each of the six New England States is provincial. They are proud and individualistic. They strive for the maximum of self-sufficiency and each is a bitter rival of the other. They have, however, been confronted by common problems. They have met them united. Already they have regained a part of their previously lost ground.

It is time for food manufacturers to face the problems common to all those who supply food to consumers. Not as dairies or shortening manufacturers or pie bakers or brewers, but as members of an all-powerful group, the food industries.

Larger Unit Steps Up Sales

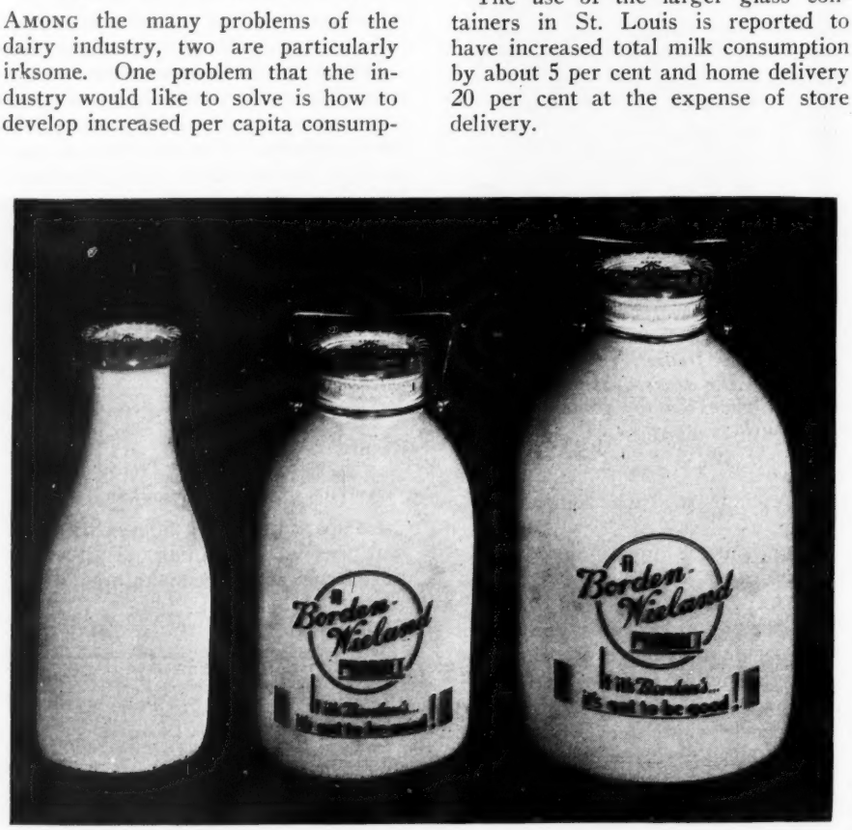
AMONG the many problems of the dairy industry, two are particularly irksome. One problem that the industry would like to solve is how to develop increased per capita consumption to absorb increased production. Another problem which keeps the industry's brass hats working overtime is how to reverse the trend toward increased retail purchases and decreased home delivery purchases of milk.

In several localities attempts have been made to solve both problems with one operation. Two of New York City's largest milk distributors have offered New York consumers home delivered milk in 2 qt. paper containers at 1½ cents less per quart than in the 1 qt. glass bottle.

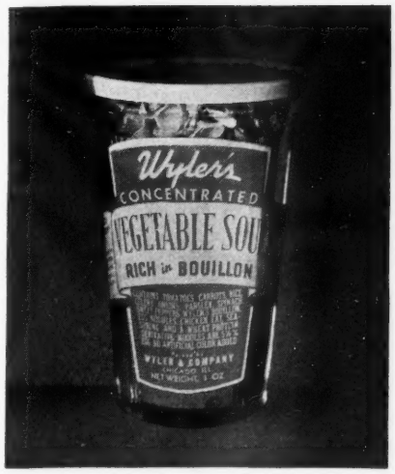
In retail outlets in suburban Chicago, 2 and 4 qt. containers have been offered for several years. Now both are offered on home delivery routes, at prices per quart below the 1 qt. glass bottle price.

Milk dealers in both New York and Chicago are hoping for results similar to or possibly better than those obtained in St. Louis since the 2 and 4 qt. glass containers were adopted there several years ago.

The use of the larger glass containers in St. Louis is reported to have increased total milk consumption by about 5 per cent and home delivery 20 per cent at the expense of store delivery.



Borden-Wieland, Chicago, bids for increased home delivery and total milk consumption with deliveries in 2 and 4 qt. glass containers at lowered price per quart.



New Packages & Products

Dry Soups Aim at Volume

Years ago, prepared "dry" soups were placed on the market. Most of them, dry soup powders in paper rolls, or dry or desiccated powders in cans, were imported. Sportsmen and campers gave them a trial, but general acceptance was never obtained. Their cost alone has kept them out of reach of the mass market. Now, however, a group of new "dry" soups are invading the mass market.

"Wyler's Concentrated Vegetable Soup", product of Wyler & Co., Chicago, Ill., contains in addition to a bouillion base, egg noodles, chicken fat and a large variety of vegetables. Wyler's concentrated soups, enough to serve four plates, are packaged in a vacuum-sealed re-use tumbler.

"Wonder" brand and "Universal" brand chicken-noodle soup mix, both products of Universal Cocoa Products Corp., Chicago, Ill., contain noodles, egg noodles, dehydrated vegetables, spice in season. Four plates of Wonder chicken-noodle soup mix are packaged in a vacuum sealed re-use table tumbler. A similar amount of "Universal" brand soup mix is packaged in a glass jar.

"Servette", a dry noodle soup mix, is packaged to catch the eye of those who dine at the fountain counter. The noodles are in a paper pie plate, held in place by transparent cellulose, which in turn is clamped to the pie plate by a colorful molded paper band. The flavoring, dried vegetables, chicken fat and wheat protein derivative, is packed as a yellow disk in the center, separate from the noodles. Servette noodle soup is a new product added by The Julep Co., Chicago, to its fountain sirups.

New All-Vegetable Cooking Fats

For those who cannot eat fats of animal origin and for those who prefer not to eat them for health or other reasons, "Chik-O," product of Cosmo Packing Co., Brooklyn, is compounded and marketed. Chik-O, to be used in place of chicken fat, is made from soybean, cottonseed, peanut and coconut oils, flavored with onions and carrots.

Designed to Fit Refrigerator

The modern refrigerator is having a noticeable effect on foods and food distribution. It has decreased the spoilage of perishables and extended the life of many foods in the home. It has influenced food processing. The refrigerator is also influencing package design. The space between shelves which provides maximum storage often eliminates the storage of products packaged in containers too tall to fit between the shelves. The Union Food Products Co., Greenville, Ohio, has recently introduced its "LaCreme" brand of catchup in wide base, shorter bottles. Catchup, though it has a relatively long pantry life after opening, is, however, stored in the refrigerator by many housewives. The shorter container meets refrigerator shelf requirements better than a taller one.

Close-up of one of the tractor-trailer units owned by H. E. Swezey & Son and used in the April 1 to August 15 packing season to haul 10 ton loads of quick frozen ducks from Farmers' Commission House, Eastport, N. Y., into the metropolitan New York area. The run is 120 miles long and takes 5 hours. The trailer is a Universal and the tractor, a Ford. The trailer body is insulated and refrigerated on the Fitz Gibbon & Crisp Icefin conductor plate system, using solid carbon dioxide as the refrigerant. The trailer body is precooled and the ducks when loaded are at a temperature of 19 to 20 deg. During the haul, the temperature drops 2 deg., the ducks reaching their destination at 17 to 18 deg.

Distribution Problem Solved
By Common Carrier Trucks

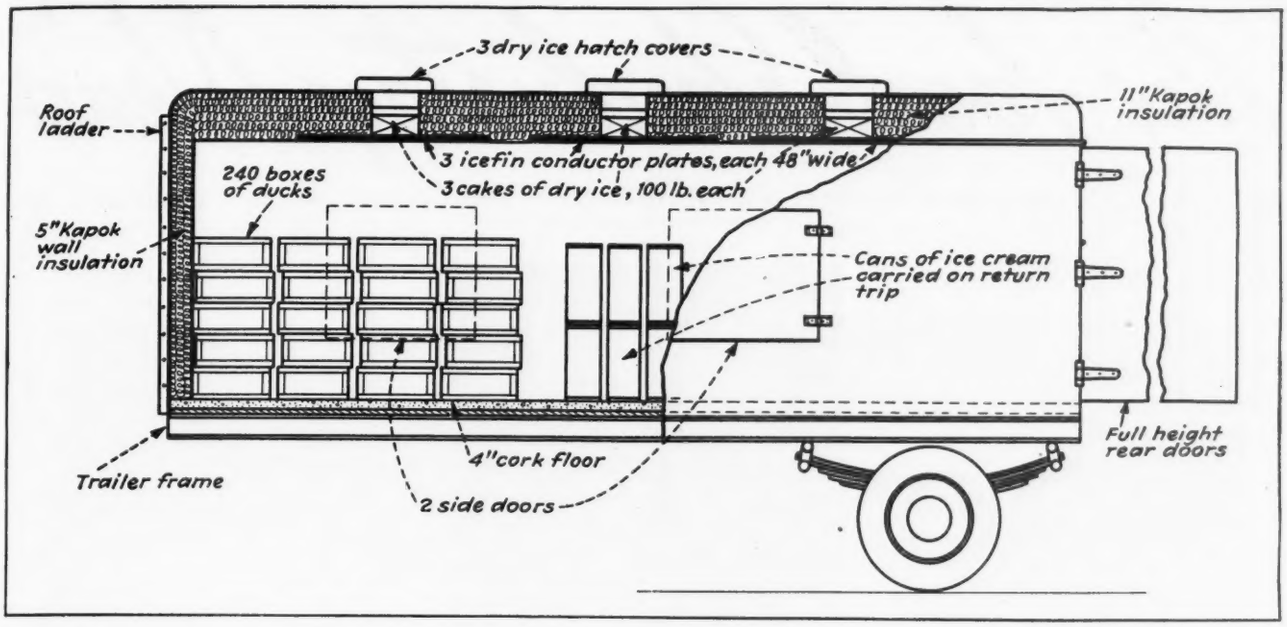
Provide quicker, cheaper and better seasonal service than railroad

HOW to obtain economical and satisfactory distribution of its seasonal product, quick frozen ducks, has been solved by Farmers' Commission House, Eastport, N. Y. The solution lies in using a common carrier refrigerated truck service. The duck farms and packing plant of F.C.H. are 120 miles from New York City, on Long Island. The facilities of one railroad are available for carrying the company's product into the city, but the use of automotive equipment with proper refrigeration facilities has furnished a quicker, cheaper and more satisfactory service.

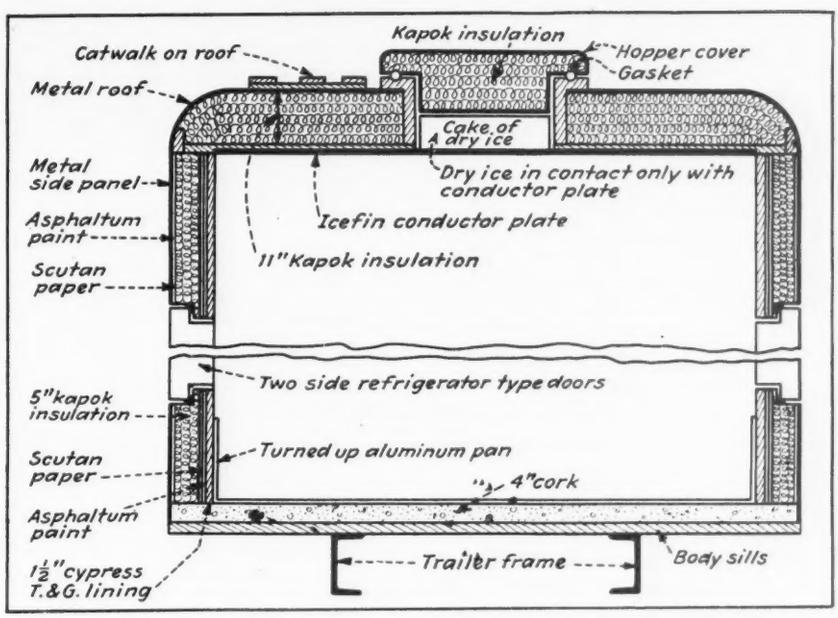
Because the duck packing period is seasonal extending approximately from April 1 to August 15 each year, it would not have paid Farmers' Commission House to purchase its own automotive equipment. So F.C.H. turned to H. E. Swezey & Son of Eastport, N. Y., to obtain the one-way haulage service required, at so much per hundredweight handled. This method provides a definite and constant unit distribution cost into the New York City area. In addition, by agreeing to give the motor carrier all of the F.C.H. business, the carrier has painted the semi-trailer equipment used with the F.C.H. name, address and trademark. Thus, F.C.H. obtains the same advertising value from the equipment on the road as it would if the vehicles were company owned, and yet it pays only on the basis of the weight carried. The value of the advertising may be judged from the picture of the trailer.

Of course, this method of distribution puts upon the carrier the burden of finding other work for the equipment to do when it is not hauling ducks. This he has done by obtaining return loads of cans of ice cream for distribution on the eastern end of Long Island. At other periods in the year, when neither ducks nor ice cream are moving, the same refrigerated units are employed to distribute fresh meats and poultry from the A. & P. plant in Garden City, N. Y., to all points on Long Island.

In the duck hauling season, three refrigerated units are used. Sometimes two trips per day are made. The running time between Eastport and New York City is 5 hours. Ten ton loads, consisting of from 220 to 240 boxes of ducks, are carried. The same equipment has been used occasionally


3 dry ice hatch covers
Roof ladder
11" Kapok insulation
3 icefin conductor plates, each 48" wide
240 boxes of ducks
3 cakes of dry ice, 100 lb. each
5" Kapok wall insulation
Cans of ice cream carried on return trip
Full height rear doors
4" cork floor
Trailer frame
2 side doors

Longitudinal cross section of trailer body, showing insulation and location of three solid carbon dioxide hoppers and the Icefin conductor plates. Each hopper will hold 100 lb. of the refrigerant. Boxes of ducks are loaded and unloaded through rear doors. When cans of ice cream are carried on return trips, they are loaded at a temperature of –20 deg. through the two smaller side doors. When care is exercised in closing these doors while loading the trailer, little temperature drop is noted at the end of the run.



Transverse cross section of the semi-trailer body showing details of insulation and refrigeration on the Fitz Gibbon & Crisp Icefin conductor plate system. The metal conductor plates are 48 in. wide and extend all the way across the ceiling for the entire inside width of the body.

to move full loads of ducks to points in northern New Jersey and to Rochester and Buffalo, N. Y.

Arriving at New York City, deliveries are made direct to the F.C.H. reefer (cold storage warehouse), to other reefers in the city or in nearby Jersey City, N. J., or direct to local customers. Except on rail shipments to reefers with rail sidings, the use of the motor equipment eliminates one handling, that between rail yard and final destination. It is this saving in handling, both as to cost and time, which makes the motorized movement both cheaper and quicker than transportation by rail. In addition, since it is not necessary to adhere to train and yard make-up schedules, the motorized service is more flexible and can be adjusted quickly to special delivery needs as they arise.

In addition to low cost, quickness and flexibility, the motorized equipment has the advantage of adequate refrigeration while the ducks are in transit. In fact, the temperature of the product is lowered rather than increased while on the road. This is made possible by the use of properly insulated semi-trailer bodies and the Icefin conductor plate system of refrigeration, using solid carbon dioxide as the refrigerant. The trailers (Universals), the bodies and the refrigerating system all are made by Fitz Gibbon & Crisp, Inc., of Trenton, N. J.

The tractors used are Fords with 34x7 dual rear tires, Ruxsteel rear axles and BK brakes. Several of the tractors are of the Ford cab-over-engine types so that the overall length of the unit is less than 33 ft. This is to conform with certain restrictions against the admittance of vehicles of greater length in the congested New York City market area.

The ducks, frozen at the Eastport plant by the "Z-Pack" brine-spray system, are loaded into the precooled trailer at a temperature of 19 to 20 deg. F. It takes about 12 hours and from 600 to 700 lb. of solid carbon dioxide to precool the body.

The temperature of the product upon arrival in New York City is from 17 to 18 deg., this reduction of 2 deg. in transit being obtained through the use of about 250 lb. of solid carbon dioxide in hatches.

The Food Industry News

Canners Meet; Report On Tomato Research

About 20,000 food manufacturers and distributors got together in Chicago the week of Jan. 21 for the biggest convention of the food industries. Contributing a large part of this attendance were members of National Canners Association. The canners spent much of the time in their general sessions discussing the economic research being done by NCA through the aid of Neil Carothers, economist of Lehigh University, and Carlos Campbell, statistician of the association.

At the technical sessions, which were better attended than ever before, the subject of keenest interest was the addition of calcium salts to canned tomatoes. This forms calcium pectinate that is not destroyed by the enzymes in the tomato after cutting or peeling and is not easily destroyed by cooking. It is not possible by the addition of a minute amount of calcium salt to produce canned tomatoes almost as firm as raw tomatoes. This important technological discovery was also much talked about outside the sessions, because there is no possibility of using it under the present Federal definition of canned tomatoes.

Among the resolutions adopted by NCA was one requesting individual canners to cooperate in the association's economic research program. Another opposed interstate trade barriers and pledged to discourage them through individual appeals to state legislatures.

H. F. Krimendahl, president of Crampton Canneries, Inc., Celina, Ohio, was elected president of NCA at the meeting. New vice-presidents include Robert C. Paulus, Paulus Bros. Packing Co., Salem, Ore., and Alfred W. Eames, president of California Packing Corp., San Francisco.

H. F. KRIMENDAHL

Pickle Buyers Report Low 1940 Carryover

A Jan. 1 salt-stock carryover of approximately 60 per cent of that on Jan. 1, 1939, was reported at the annual meeting of National Pickle Packers Association in Chicago on Jan. 24. The indicated total carryover for the industry is 4.7 million bushels as compared with approximately 7.5 million bushels a year ago. Reporting members indicate a contemplated increase in acreage for 1940 over that planted in 1939 to give a total of 34,095 acres, or an increase of 47.8 per cent.

In keeping with the research program to determine the nutritive food value of pickles decided upon by the association last June, Prof. F. W. Fabian made a progress report to the effect that pickles compare favorably with cabbage, sauerkraut and cranberries in respect to vitamins, minerals and digestible acids content. Because of their salt content they can be favorable factors in the maintenance of the physiological salt balance in the human body, particularly in summer when the perspiration rate is relatively high.

The following officers were elected: president, E. S. La France, Pepin Pickling Co., Winona, Minn.; vice-president, Earl Price, Libby, McNeill & Libby, Chicago; secretary-treasurer, F. D. Gorsline, Chicago.

Preservers Want Standards

Need for standards of quality as well as of identity in frozen pack fruits was emphasized in the meeting of National Preservers Association held in Chicago, Jan. 22. Progress in formulating standards of identity was reported at the meeting. Hearings have been completed and a brief filed with the Department of Agriculture as of Jan. 15. Standards of quality are considered impracticable, at least pending adoption of standards of quality for frozen pack fruits.

Paul M. Williams, Department of Agriculture, stated that if standards are to be drawn for cold pack fruits in barrels and if these barreled products are to be inspected on the basis of the standards, a difficult problem in proper inspection technic will be met. Grading for quality at the destination presents difficulties. As a substitute, he suggests the official inspection certificates issued to handlers of frozen products licensed under the Perishable Agricultural Commodities Act.

The association reelected President Royal Shawcross, A. A. Knight & Son Corp., Boston; Vice-president Alex N. Chappell, Bama Co., Birmingham; and Secretary-Treasurer W. L. Walde, Washington.

Peanut Butter Makers Form Trade Association

Convinced of the need for quality standards and improved marketing practices in their industry, a group of peanut butter manufacturers met in Chicago on Jan. 24 to initiate the Peanut Butter Manufacturers Association.

The new association is an outgrowth of National Preservers Association. One of its objectives will be to work out standards of quality predicated upon the use of U. S. No. 1 grade of peanuts for recommendation to the Federal Trade Commission as a basis for fair trade practices and to the Food & Drug Administration for the promulgation of standards of definition and quality.

George A. Beardsley, J. W. Beardsley Sons, Newark, N. J., was elected president, with Alex N. Chappell, the Bama Co., Birmingham, as vice-president. Secretary-treasurer duties will be handled by the Washington office of National Preservers Association for the present.

Peanut butters made by various manufacturers and purchased over the country from retail stores were analytically examined at the Chicago meeting for composition and wholesomeness for human consumption. Approximately one-third of those examined were of questionable quality. As much as 300 mg. of insoluble residue per 100 g. sample was found in some which were definitely gritty to the teeth and palate. Comparison with analyses made by the Department of Agriculture indicate that the offending butters were made from very low grade peanuts and that choice of peanuts used is a determining factor in respect to quality of finished product.

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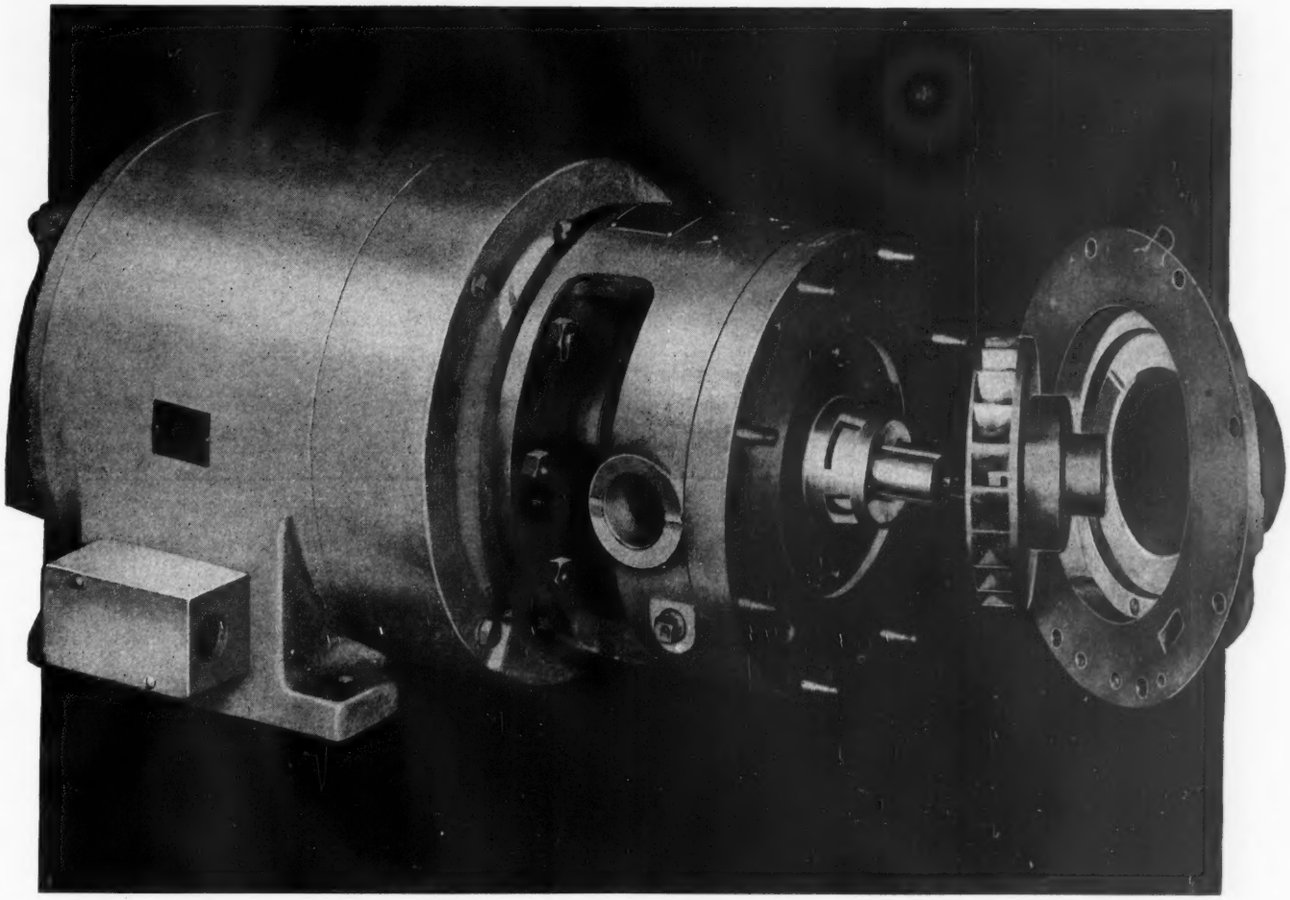

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Activity on Standards Renewed by Committee

Three open meetings were held in January by the Food Standards Committee. The first of these meetings was on a definition and standard of identity for oleomargarine, Jan. 26; the second on a definition and standard of identity and standards of quality and fill of container for canned fruits for salad and canned fruit cocktail, Jan. 29; and the third, on standards of identity for bread, whole wheat bread, raisin bread and milk bread, Jan. 31.

These hearings are the first sign of standard making activity by the F&DA for some months. The slump in this work has been due to the absence of C. W. Crawford, F&DA draftsman of proposed standards, who has been ill since last summer. Mr. Crawford has not fully recovered, but is to start work in the Jacksonville, Fla., office of the Administration, and is expected to aid in speeding up proposed standards and hearings.

$200,000 More Budgeted For Food, Drug Activities

Approximately $200,000 more has been alloted in the national budget to the Food & Drug Administration, it was revealed by President Roosevelt's annual budget message at the opening of Congress. This is regarded in Washington as an indication of greater stress on standards making during the 1941 fiscal year. The budget appropriation for the Administration is $2,959,658 as compared with $2,741,138 for the current fiscal period, an increase of $218,520. This increase, of course, has still to run the gauntlet of the House Appropriations Committee, which is expected to cut some, but not much, from the increase.

Standards Promulgated For Four Canned Foods

Latest additions to the list of foods for which standards have been promulgated by the Secretary of Agriculture include canned cherries, canned apricots, canned pears and canned peaches. Standards of identity, fill of container and quality for the canned apricots, cherries and pears take effect April 7, having been published in the *Federal Register* on Jan. 9. Standards of identity for canned peaches were issued in the *Federal Register* of Dec. 22 and become effective on March 18. Standards of quality and fill of container for canned peaches were issued on the same date but become effective one day later.

Industry opposition has been voiced to the standards for canned cherries, and there is a possibility that the matter will be carried to court. The standard of identity for cherries specifies that the word "sour" be used as a varietal designation on the label, something that was vigorously opposed by representatives of the industry at the hearings. The industry had asked that "Royal Ann" be made a varietal designation for sweet cherries; that the words "black" and "white" be used instead of "light" and "dark" for sweet cherries, and that the word "sour" be omitted from the designation for canned red cherries. The Department of Agriculture rejected these suggestions in formulating its final standards.

In respect to the sweetening ingredient, the final standards met the expectations of industry. Neither sucrose nor dextrose need be declared on the label, and this is also true of the standards for canned peaches. The label for canned peaches need describe the sirup packing medium as only "light sirup", "medium sirup", "heavy sirup" or "extra heavy sirup." Additional spice, seasonings and flavorings must also be declared.

British Press Combine

WAR BISCUITS—GOOD FOR 10 YEARS

In line with the British plan of food storage, a bakery in Reading, England, is producing an "emergency bread" guaranteed to keep for at least 10 years in the tins in which it is sealed. The product is said to taste like toasted bread.

Supreme Court Upholds Patman Law in A&P Case

By indirect action the Supreme Court has upheld the brokerage provisions of the Robinson-Patman Act and the power of the Federal Trade Commission to enforce that act. The court on Jan. 2 denied the petition of Great Atlantic & Pacific Tea Co. for a writ of certiorari to review a judgment of the Circuit Court of Appeals for the Third Circuit. This judgment affirmed the FTC order directing A.&P. to cease and desist from accepting allowances and discounts in lieu of brokerage in violation of Sec. 2 (c) of the Robinson-Patman law. The order prohibited A.&P. from purchasing commodities at so-called net prices which involved a price concession in lieu of brokerage, from accepting so-called quantity discounts and other types of discounts granted in lieu of brokerage, and from accepting discounts and payments of all kinds representing, in whole or in part, brokerage on its own purchases.

The Supreme Court in its action was consistent with its refusal on Oct. 17, 1938, to review a Circuit Court of Appeals decision affirming a FTC order under Sec. 2 (c) in the case of Biddle Purchasing Co.

Industries File Briefs On Proposed Standards

Opposition to food standards proposed by the Food and Drug Administration is contained in briefs filed with the Administration by representatives of various industries. M. L. Toulme, secretary of the National-American Wholesale Grocers' Association, argues that the statement of optional ingredients on the labels will confuse the consumers and will result in higher retail prices because of greatly increased label expenses. The H. J. Heinz Co. brief makes much the same contentions regarding fruit butter standards.

In a brief filed in connection with proposed cream cheese standards, E. I. du Pont de Nemours & Co. contends that specific label declarations on op-

tional ingredients should be demanded only when such declarations would serve some useful purpose, and after a "realistic appraisal of consumer confusion and possible commercial abuse." The du Pont brief urged that standards should permit the use of proportionate salts to prevent the development of surface mold in cream cheese, but did not object to the requirement that the presence of these salts be declared on the label.

The National Cooperative Milk Producers Federation supported the du Pont brief with respect to propionate salts, and Fairmont Creamery Co. and Kraft-Phenix Cheese Corp. also asked that the standards permit use of these salts.

Names Jury to Select Best Packages for 1939

Several authorities on packaging have been placed on a jury of award by American Management Association to select the outstanding packages for 1939. These people will judge the packages entered in the ninth annual competition for the Irwin D. Wolf Awards, sponsored by AMA. All packages entered in this competition will be exhibited at the Tenth Packaging Exposition, to be held at the Astor Hotel, New York, March 26–29. Entries for the competition will be accepted up to Feb. 10.

The personnel of the jury of award, which will pass on the merits of all packages entered, includes Mrs. Katharine M. Ansley, executive secretary of the American Home Economics Association; James C. Boudreau, director, School of Fine and Applied Arts, Pratt Institute; Allan Brown, director, Public Relations, Bakelite Corp.; Gordon Cole, advertising Manager, Cannon Mills, Inc.; Joseph Givner, assistant to the vice-president in charge of merchandising, Sears, Roebuck & Co.; Edgar Kobak, vice-president, Lord & Thomas; C. B. Larrabee, editor, *Printers' Ink* Publications; Ray M. Schmitz, vice-president, General Foods Sales Co., Inc.; Miss Dorothy Shaver, vice-president, Lord and Taylor.

Label Exemption Denied

Flat refusal of the request by the salad dressing interests for a temporary exemption from the ingredient listing provision of the new Food, Drug & Cosmetic Act has been issued by Secretary Wallace. This action is in line with former indications of the Administration's attitude. But the Secretary ruled that to reduce the problem for this industry somewhat, the specific name of each vegetable oil or each vinegar used need not be declared, except in general terms.

Sugar Quotas Restored

Marketing quotas on sugar have been restored, effective Jan. 1, by a Presidential proclamation terminating the Sept. 11 suspension of these quotas. The President, in explaining his action, stated that there was no longer evidence of sugar hoarding by consumers and that the price of the commodity had declined to the price in effect before the war in Europe started.

Re-establishment of the quota system reduced immediately the tariff duty on Cuban sugar from $1.50 to 90 cents per 100 lb. Such reduction was provided for in a trade agreement concluded between the United States and Cuba whereby the reduction was to be made as soon as the President restored the quotas.

WPA Canneries Pack Foods in 27 States

In turning out several million quarts of canned foods in some 27 states, the WPA has been careful to keep closely to its policy of avoiding competition with private industry, according to Mrs. Florence Kerr, who is in charge of the professional and service program of the relief agency. None of this food is sold and none is given to persons who would be able to buy it in the open market, she states.

Typical of the states where these canneries are operated by WPA are Massachussetts, with nine projects and a production of 1,580,137 cans of foods; Oklahoma, with an average production of approximately 31,000 lb. of canned vegetables monthly; and Texas, with an average of 150,000 cans monthly. Other states in which the WPA canning projects are in full swing, include Oregon, Louisiana, Colorado, Florida, Georgia, Idaho, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Oregon, South Carolina, Tennessee, Virginia, Washington, West Virginia and Wisconsin.

Plan Technology Program

Four three-hour sessions will be devoted to symposiums on food engineering and on the influence of processing on the vitamin content of foods at the

Schedule of Current Action on Food Standards

(Dockets 1, 2, 3, 4 and 9 have been completed and dropped from this table*)

Docket number and commodity	Type of standard or regulations	Presiding officer	A — First announced in Fed. Register	B — Initial hearing date	C — Preliminary briefs due not later than	D — Examiner's findings published in Fed. Register	E — Secretary's order published in Fed. Register	F — Effective date of order
5-I Canned peaches	Identity, quality, fill	J. M. Fox	Mar. 7, '39	April 10, '39	June 26, '39[1]	Sept. 7, '39[3]	Dec. 22, '39	Mar. 18, '40[3]
5-II Canned apricots			Mar. 7, '39	April 10, '39	June 26, '39[1]	Oct. 5, '39[4]	Jan. 9, '40	April 7, '40
5-III Canned pears			Mar. 7, '39	April 10, '39	June 26, '39[1]	Sept. 19. '39[4]	Jan. 9, '40	April 7, '40
5-IV Canned cherries			Mar. 7, '39	April 10, '39	June 26, '39[1]	Oct. 11, '39[4]	Jan. 9, '40	April 7, '40
6 Canned peas	Identity, quality, fill	J. M. Fox	Mar. 7, '39	April 17, '39	June 29, '39[1]	Nov. 9, '39[5]	.....	.....
7-A Cream	Identity	F. S. Hassell	Mar. 28, '39	May 1, '39	July 27, '39[1]	Sept. 26, '39	.....	.....
7-B Whipping cream			Mar. 28, '39	May 1, '39	July 27, '39[1]	Sept. 26, '39	.....	.....
7-C Evaporated milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	.....	.....	.....
7-D Sweetened condensed milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	.....	.....	.....
7-E Dried skim milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	.....	.....	.....
8 Canned vegetables	Identity	F. S. Hassell	Mar. 24, '39	April 24, '39	June 19, '39[1]	Aug. 15, '39	.....	.....
10-A Fruit jams	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	.....	.....	.....
10-B Fruit jellies	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	.....	.....	.....
10-C Fruit butters	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	.....	.....	.....
11-A Cheddar cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Sept. 25, '39	Dec. 1, '39[1]	.....	.....	.....
11-B Washed curd cheese			Aug. 22, '39	Sept. 25, '39	Dec. 1, '39[1]	.....	.....	.....
11-C Colby cheese			Aug. 22, '39	Sept. 25, '39	Dec. 1, '39[1]	.....	.....	.....
12 Cream cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Oct. 2, '39	Dec. 15, '39[1]	.....	.....	.....
13 Coal-tar colors[2]	Listing and certification	F. S. Hassell	Oct. 20, '39	Nov. 20, '39	Dec. 15, '39	.....	.....	.....

[1] Time extended from earlier date previously announced.

[2] Amending order of Docket 4.

[3] Standard of identity only; standard of quality and standard of fill of container published in *Federal Register* on Sept. 15, '39.

[4] Standard of identity only; standards of quality and fill of container published in *Federal Register*, Oct. 24, '39.

[5] Standard of identity only; stan dards o f quality and fill of container published in *Federal Register*, Nov. 25, '39.

[6] Standard of identity only; standards of quality and fill of container effective March 19, '40.

*Docket 1 pertains to tomato products, 2 to canned tomatoes, 3 to eggs and egg products and 4 and 9 to coal-tar colors. See FOOD INDUSTRIES October, 1939, page 569, and January, 1940, page 70, for this data.

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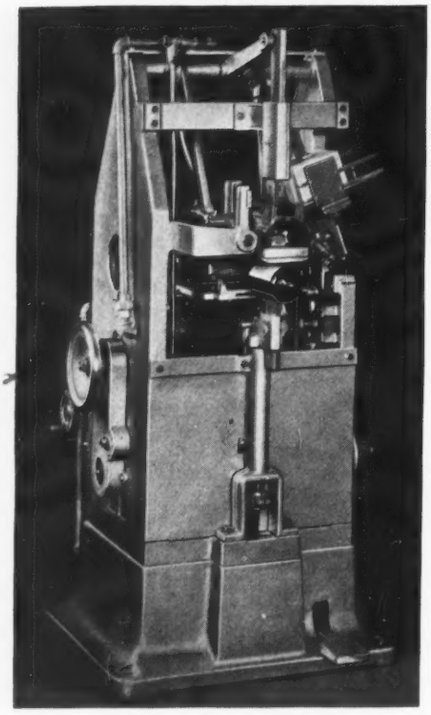

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first annual meeting of Institute of Food Technologists, at Chicago, June 17–19. These symposiums will be supplemented by voluntary and solicited papers on food preservation, composition of foods, methods of analyzing foods and packaging of foods. One day of the meeting will be devoted to visiting plants characteristic of Chicago's food industry.

Titles and abstracts of all volunteer papers must be submitted for approval not later than March 1 to Dr. D. K. Tressler, New York State Agricultural Experiment Station, Geneva, N. Y.

End Argentina Trade Talk

Refusal of Argentina to give full recognition to the principle of most-favored-nation treatment to American goods has been given as one of the primary reasons for the breakdown in the reciprocal trade agreement between that country and the United States, according to Commissioner A. Manuel Fox of the Tariff Commission in testifying before the House Ways and Means Committee. He stated that negotiators found that they were unable to obtain for American goods the same equality of treatment that was being accorded products of Great Britain and France.

Heretofore, the stumbling block in trade negotiations was believed to be an insistence by the United States on placing such Argentina products as canned beef and flaxseed under a quota system. Besides a breakdown in negotiations with Argentina, talks with Uruguay have also collapsed.

Prevents Differential

Products of the same grade, quality and weight should not be sold at one price in one trade area and at a lower

CAPITAL VIEWS

BUDGET AND TAXES—The President's budget message to Congress made an economy gesture. But Congress does not like the heavy cuts suggested in important relief, agricultural and other politically interesting projects. This gives great importance to the sincere effort of Senator Harrison to establish a joint Congressional committee which might give a realistic review of income and spending problems and their inter-relationship. Even the generous spenders realize that something will have to be done in the way of important economies. The alternative is terrifying in an election year as it involves a levy of new taxes that voters would feel before election. The food industries are the only ones that are likely to catch new tax burdens which are greater than average. The prospect of processing taxes on certain agricultural products has waned somewhat, but still remains a cause for sincere worry, especially for the wheat millers.

TARIFF BATTLE— The trade agreement question will be debated at length and with bitterness. The Administration has mustered its full force back of the proposal for another three year extension of the authority of the Secretary of State to negotiate trade agreements. The fortunes of battle will swing back and forth for many weeks to come, some say until May. And in the last analysis, the decision will be largely on the issue of support of the President and Mr. Hull. Economic and social arguments will be conspicuous, but the decision each member of Congress makes is essentially political.

LARD VS. SHORTENING– The manufacturers of shortenings made from cottonseed oil are arguing to the Department of Agriculture that their product is just as much a surplus commodity as lard. They would like FSCC, which has bought a lot of lard to strengthen that market, to take over manufactured shortening also. This group lacks the leverage of a directly supporting constituency and thus is not likely to get as favorable attention as do the lard makers with their corn-hog farmer backing. The situation is another case of an important political factor in the inter-fat competition.

STANDARDS CONFERENCES— More rapid and real progress on food standards is now expected since the Food Standards Committee is following up its policy of holding open sessions for discussion of standards of identity before they make any recommendation to the Food and Drug Administration. Three such sessions were announced for late January, dealing, respectively, with oleomargarine, canned salad fruits and fruit cocktail and four types of bread.

But no one should expect that these hearings will lead immediately to the more formal official proceedings. The comparable ice cream conference held the middle of November is not expected to result in the promulgation of even a tentative standard for formal consideration until March, at the earliest. The other commodities will come along in their turn, probably early next summer.

NO SERVICE, NO FEE— The United States Supreme Court supports the idea that the Robinson-Patman law forbids the taking or giving of fees or discounts equivalent to brokerage when the services are not rendered by a wholly independent broker. Thus, the A.&P. is denied relief from the Federal Trade Commission order and must discover some different way to take advantage of its large scale buying if it is to stay within this law.

FOODS FROM PHILIPPINES– Several food commodities are importantly affected by the new regulations regarding movement from the Philippines to the United States. Coconut oil, sugar and other important food articles now are treated in part as if they were from a foreign country instead of an insular possession. For each of the next five years there will be further advances by steps of 5 per cent in the requirement for export taxes from the islands and cuts in the quotas restricting duty free import into the States. Thus, the Philippines get a preview of the commodity economics of independence.

price in other areas in the opinion of the Federal Trade Commission. And a cease and desist order prohibiting Metz Bros. Baking Co., Sioux City, Iowa, from making such price differentials in the sale of bread has been issued by the FTC under the Robinson-Patman Act. According to the order, the bakery lowered the prevailing wholesale price of bread in southwestern Minnesota and southeastern, northwestern and central South Dakota while maintaining the price in northwestern Iowa. The effect was claimed to be a substantial lessening of competition and injury to or prevention of competition between the bakery and its competitors.

Britain Rations Food

The prevent a shortage of food as a result of conditions imposed by the war, Britain on Jan. 8 put the people on food rations. Even members of the royal family have ration cards. This first regulation on food restricts the amount of sugar to 12 oz. a week per person, butter to 4 oz. and ham or bacon to 4 oz. Other meats will be rationed later, the amount and effective date probably being announced this month.

On Jan. 22 the rationing of sugar was extended to British food manufacturers. Condensed milk, sirup, jam and chocolate manufacturers were allotted 70 per cent of their normal consumption. Mineral water manufacturers were cut to 25 per cent of their peacetime requirements.

Fermentation Discussed

Fermentation, principally pertaining to foods, was the subject of an important symposium at the 41st general meeting of Society of American Bacteriologists, at New Haven, Conn., Dec. 28–30. Outstanding among the papers at the symposium were: "Sauerkraut Fermentation," by Carl S. Pederson, New York State Agricultural Experiment Station, Geneva; "Effect of Added Sugar to Fermented Sauerkraut and

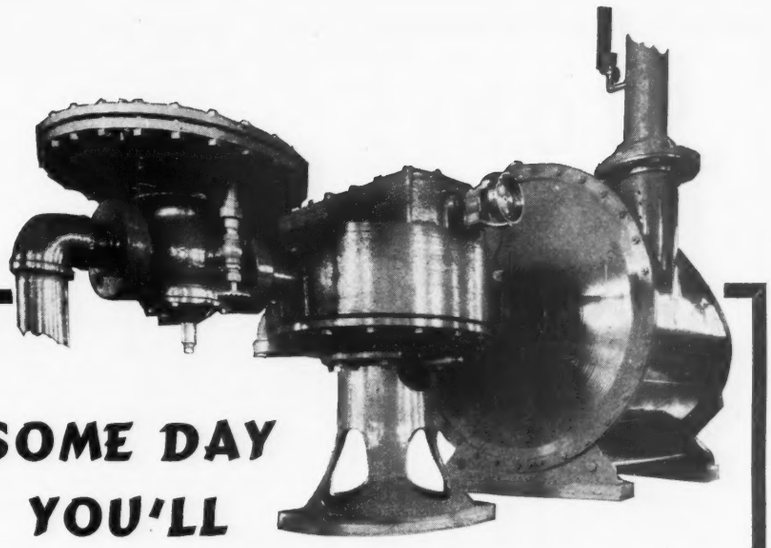
SCHEDULE OF EVENTS

February

5–17—Nineteenth Annual Canners and Frozen Food Packers School, Food Industries Department, Oregon State College, Corvallis.
6– 9—Dairy Conference, Department of Dairy Technology, Ohio State University, Columbus.
9–17—National Canned Salmon Week.
15–22—National Cherry Week.
20–22—Pickle and Kraut Packers Technical Conference, Michigan State College, East Lansing.
26–March 2—Twelfth Annual State College of Washington Institute of Dairying, Pullman.

March

7– 9—Canners League of California, Del Monte.
11–14—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago.
12–14—Conference of Dairy Manufacturers, University of Wisconsin, Madison.
26–29—Tenth Annual Packaging Conference, Hotel Astor, New York.



SOME DAY YOU'LL LOOK UP TO THIS DEVICE

Air—gas—conditioning is what it does . . . premixes gas with exactly the right amount of air to give you exactly the kind of flame you want.

The Kemp Industrial Carburetor will give you a reducing flame or an oxidizing flame, the flame pressure you desire, a turn-down range you never knew before, a flame that will burn in an enclosed chamber or actually in *solution!* It will also give you a saving of 15 to 50 percent in fuel (if that is important). No wonder this equipment is so often found supplying high temperature cookers, roasting and baking ovens and can-making machinery in the most modern food plants. Shall we get down to cases? Address **The C. M. Kemp Manufacturing Co., 405 E. Oliver Street, Baltimore, Md.**

KEMP of BALTIMORE

STOP! LOOK! PROFIT!

If you'll *stop* right now and write for Bulletin 103-35 . . . if you'll *look* through it carefully and select the pumps you need—you'll *profit* from now on.

You'll save on repairs and replacements because Viking's simple, practical principle, of only 2 moving parts, guarantees constant performance, plus longer life. You'll save on lower operating costs . . . you'll save on higher operating efficiency.

Viking's selection, of both portable and stationary units, is the most complete in the world. Investigate today.

FIG. 32 — Viking Standard Pump . . . easily installed . . . offered in sizes from 5 to 1050 GPM.

VIKING
PUMP COMPANY
CEDAR FALLS, IOWA

Pickles," by C. R. Fellers, J. A. Clague and A. S. Levine, Massachusetts State College, Amherst; and "The Fermentation of Ameliorated Musts," by Harry E. Goresline, E. A. Beavens and A. L. Curl, Bureau of Agricultural Chemistry and Engineering, United States Department of Agriculture.

Would Cut Sugar Imports

Domestic sugar interests are working out a bill intended to replace the "offshore" quota provision of the Costigan-Jones Act. This provision will expire March 1. Continental beet and cane growers are seeking an agreement with Hawaiian and Puerto Rican planters for a greater share of the home market. Such an agreement would result in holding down the imports into this country from Cuba.

A bill proposed by American Sugar League would limit imports of direct consumption sugar from Cuba to 250,000 tons annually and from the Philippines to 50,000 tons. And it would make the $1.50 per 100 lb. tariff apply to all imports.

The domestic planters propose, if they find it possible, to have a permanent law making quotas mandatory and specific, instead of permissive within the discretion of the Secretary of Agriculture, as the statute now provides.

Bacteria Rust Cheese

It is the presence of color-producing strains of the lactic acid bacteria commonly found in milk that causes "rusty-spot" or reddish areas to develop in the mechanical holes of well-ripened hard cheese. This is the theory advanced by Dr. R. S. Breed and Dr. C. S. Pederson, bacteriologists at the New York State Agricultural Experiment Station at Geneva, N. Y. This rusty-spot condition is almost always associated with lack of strict attention to sanitary procedure in cheese factories.

Trade Rules Proposed For Ripe Olives, Tuna

Trade practice rules have been proposed by the Federal Trade Commission for the ripe olive and the tuna industries. A hearing on the suggested regulations for the olive industry was held in Washington on Jan. 30 and one on the proposed rules for the tuna industry is scheduled for Feb. 2. Trade practice conferences on both industries were held on the Pacific Coast last summer, the proposed rules being the result of those hearings.

For the purpose of the rules, FTC has defined olives which are unfit for packing as olives which are unclean, immature, moldy, overripe, infested with fungus, rot or other defects, or which are in any manner unwholesome. The proposed rules, of course, prohibit the sale of any olives in this category.

Construction News

	Pending (thousands)	Awarded January (thousands)	Total Awarded 1939 (thousands)
Bakery	.....	.....	$4,044
Beverages	$485	$190	6,663
Canning and Preserving	90	.....	200
Confectionery	.....	.....	125
Grain Mill Products	.....	.....	4,780
Ice Manufactured	40	.....	490
Meats and Meat Products	190	.....	1,191
Milk Products	205	179	2,101
Miscellaneous	3,275	849	4,255
	$4,285	$1,218**	$23,849

** Complete 1939 total.

The suggested regulations for tuna define "fancy tuna," "standard tuna," "tuna flakes" and "grated or shredded tuna," and misuse of these terms is prohibited.

The proposed rules for both the olive and tuna industries prohibit practices generally considered unfair or unethical, conforming closely to trade regulation codes which have been adopted by other food industries.

Authorizes Two Methods of Killing Fruit Fly

Two authorized methods—a heat treatment and a cold treatment—have been established by the Bureau of Entomology for oranges and grapefruit suspected of contamination by the fruit fly. Neither the heat nor the cold processing is believed to damage the material for the fresh fruit market. Hence either method should be applicable to fruit destined for canning or further processing, when such treatment is required. The approved methods are:

Heat Treatment—Heating the fruit with air at 100 per cent relative humidity for a period of not less than 16 hours, during which time the temperature at the approximate centers of the fruits shall be raised to 110 deg. F. or above and maintained at 110 deg. F. or above for the last 8 hours of such treatment.

Cold Treatment—Cooling until the approximate centers of the fruits reach a temperature of 34 deg. F. or below and holding the fruits so that the inside temperature does not exceed 34 deg. F. for a period of 15 days.

Studies Vitamin B_1 Losses

Foods such as nuts and meats that are often prepared by roasting lose more of their vitamin B_1 value than foods cooked a shorter time or at lower temperatures. This is a fact revealed by studies of the Bureau of Home Economics, Department of Agriculture, and mentioned in a report of Louise Stanley, chief, to Secretary Wallace. The broiling of meat is less destructive of vitamin B_1 than roasting.

The losses in vitamin B_1 value as a result of cooking may be as great as 50 or 60 per cent, but in most of the

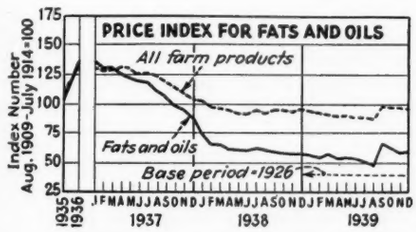
common vegetables these losses need not exceed 10 or 15 per cent. To limit such losses to 10 or 15 per cent, however, it is necessary to avoid overcooking and to limit the cooking liquor to a quantity that can be served with the vegetable or used in some other way.

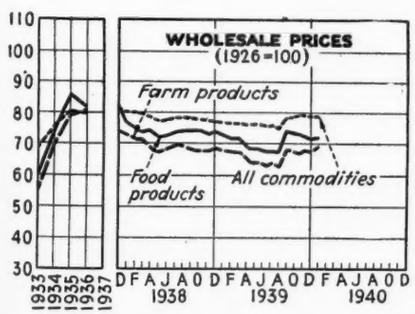
Vegetable Use Up

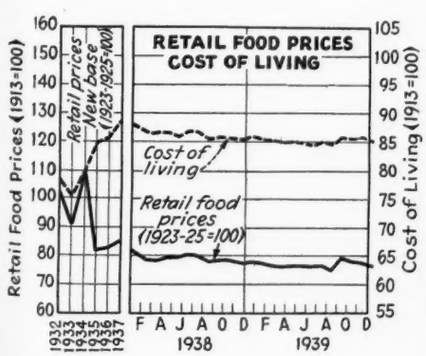
Official estimates indicate that potato consumption has declined in the United States from 2.95 bu. per capita per annum in the 1910–1914 period to 2.32 bu. in the 1933–1937 period. At the same time, the consumption of fruits and vegetables generally has gone up. Estimates for thirteen major vegetable crops indicate a rise in annual consumption of from 51 to 87 lb. in the twenty-year period ending with 1937. There has been a similar advance in the consumption of fruits, especially citrus fruits, amounting to about a 30-lb. per capita per year increase for the same period.

Commodity Prices Steady

Little change occurred in the level of prices of food commodities during the month from mid-December to mid-January, while the general commodity price index of the *N. Y. Journal of Commerce* for the period stood unchanged at 81.8. The grain index of


PRICE INDEX FOR FATS AND OILS
Index Number Aug. 1909-July 1914=100
All farm products
Fats and oils
Base period-1926
1935 1936 1937 1938 1939




RETAIL FOOD PRICES COST OF LIVING
Retail Food Prices (1913=100)
Retail prices New Base (1923-25=100)
Cost of living
Retail food prices (1923-25=100)
Cost of Living (1913=100)
1932 1933 1934 1935 1936 1937 1938 1939

Beech-Nut puts plenty of *Selling in these packages*

Good design, attractive colors, enticing display of the product, and neat, flawless wrapping all combine to give these Beech-Nut packages strong sales appeal.

Close examination of each package shows how well the wrapping machine did its part in producing this attractive result. The printed panels on the transparent cellulose are perfectly registered on the edges of the package . . . end-folds and bottom seams are firmly sealed . . . and the tension of the wrapping material over the tops of the packages is just right, so as to produce a smooth, glass-like window through which the products are clearly seen.

All three of these modern packages are wrapped on our Model FA-Q machines. Our machines are doing equally efficient wrapping jobs for many other leading manufacturers.

If you go into any grocery store, drug store, or candy store, you will find many examples of the work done by our machines—packages that are striking and appealing, that catch the eye and sing out "Buy me!"

We are constantly working with manufacturers to develop new and better forms of packaging. When you have a packaging problem—whether it be to wrap a new product or to give an old product greater sales appeal—bring it to us.

Literature on request

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

Peterborough, England: Baker Perkins, Ltd. Melbourne, Australia: Baker Perkins Pty., Ltd.
Mexico, D. F., Apartado 2303 Buenos Aires, Argentina: David H. Orton, Maipu 231

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

the same publication declined during the period, from 76.1 to 74.0; and the food commodity index rose slightly from 66.6 to 66.8 during the same four weeks.

Spot prices for various foods showed a generally steady level during the past month. Wheat, No. 2 dark winter, at $0.96¾ on Jan. 16 was down from $1 on Dec. 16. Beef at 14½ c. had gone up from 14 c. on the earlier date. Pork was unchanged. Eggs were down from 20½ c. to 20 c. Butter increased from 30½ c. to 31 c. Cheese was steady around 18 c. Coffee and canned foods were unchanged. Cocoa fell from $6.05 to $5.55 and sugar also declined, from $2.95 to $2.90.

INDICATORS

SNAP BEANS canned in 1939, according to figures recently compiled by National Canners Association, amounted to 6,945,970 cases of green beans and 1,109,873 cases of wax beans, a total of 8,055,843 cases.

FLOUR PRODUCTION in December, 1939, by mills representing about 64 per cent of U. S. capacity, according to the Northwestern Miller totaled 6,227,960 bbl. This figure compared to 5,800,689 bbl. in November, 1939, and 6,473,289 bbl. in December, 1938, for the same mills.

SALES OF CONFECTIONERY and competitive chocolate products in November, 1939, were $25,386,000, which was a 6.5 per cent increase over October, 1939, and a 2.9 per cent increase over November, 1938.

FISHERY PRODUCTS in cold storage on Dec. 15, 1939, totaled 92,718,000 lb., according to the U. S. Bureau of Fisheries. This compared to 90,711,000 lb. a year before and a five-year average of 82,841,000 lb. for the date.

BUTTER, creamery, produced during November, 1939, totaled 112,285,000 lb., 4 per cent below the production of November, 1938, but 3 per cent greater than the average production for the month in the years 1930–1937.

BUTTER, creamery, produced in the first eleven months of 1939 was 1,638,965,000 lb., 1 per cent below the period in 1938, but 6 per cent above average production for the first eleven months of the years 1930–37.

CHEESE PRODUCTION in November, 1939, was 30,145,000 lb., compared to 30,170,000 lb. in November, 1938. This figure was 27 per cent below the October, 1939, output, but was 19 per cent over the November average for the years 1930–1937.

EVAPORATED and condensed milk production in November, 1939, amounted to 127,883,000 lb., more than 20 per cent over the November, 1938 figure.

OLEOMARGARINE sales in November, 1939, as indicated by sales of internal revenue stamps, totaled 27,257,175 lb., compared to 30,577,426 lb. in November, 1938.

COFFEE CONSUMPTION in the United States in 1939 reached the all-time high figure of 14.4 lb. per capita, according to figure of the New York Coffee and Sugar Exchange.

SOY BEAN PRODUCTION in the United States in 1939, at 87,409,000 bu. was the largest on record, comparing to 63,000,000 bu. in 1938.

FRUITS, frozen, in storage on Jan. 1, 1940, totaled 128,116,000 lb., compared to 125,761,000 lb. on Jan. 1, 1939 and to a 1935–1939 average of 92,993,000 lb. for the date.

VEGETABLES, frozen, in storage on Jan. 1, 1940, totaled 72,145,000 lb., compared to 65,544,000 lb. one year before.

BUTTER, creamery, in storage on Jan. 1 of this year was 55,468,000 lb., compared to 126,770,000 lb. one year before, and to an average of 64,050,000 lb. for the same date in 1935–1939.

CHEESE, all kinds, in storage, on the first of this year amounted to 108,183,000 lb., compared to 120,174,000 lb. a year earlier, and to 107,256,000 lb. average for Jan. 1 in the years 1935–1939.

EGGS, case equivalent, in storage on Jan. 1, 1940, amounted to 2,598,000 cases. The figure on Jan. 1, 1939, was 2,099,000 cases and the Jan. 1 average in 1935–1939 was 2,727,000 cases.

POULTRY, frozen, all kinds, in storage on Jan. 1, 1940, amounted to 167,458,000 lb., compared to 139,108,000 lb. on Jan. 1, 1939, and to an average of 137,977,000 lb. on Jan. 1 in the years 1935–1937.

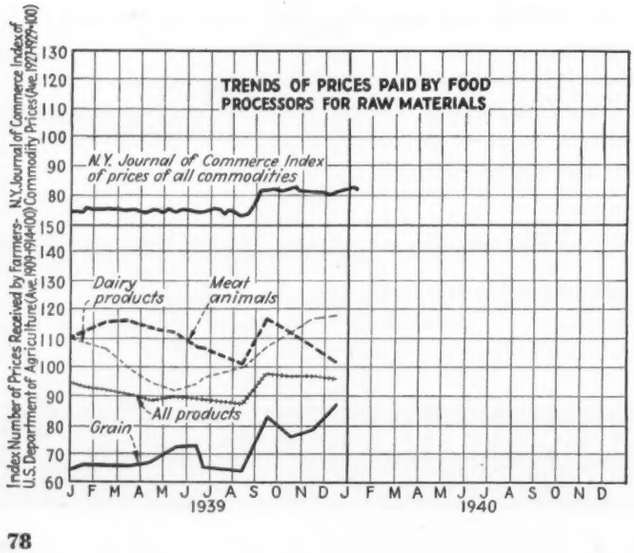
MEAT, all kinds, in cure and frozen storage on Jan. 1 of this year totaled 645,117,000 lb., compared to 563,872,000 lb. a year before and to an average of 713,200,000 lb. for the date in 1935–1939.

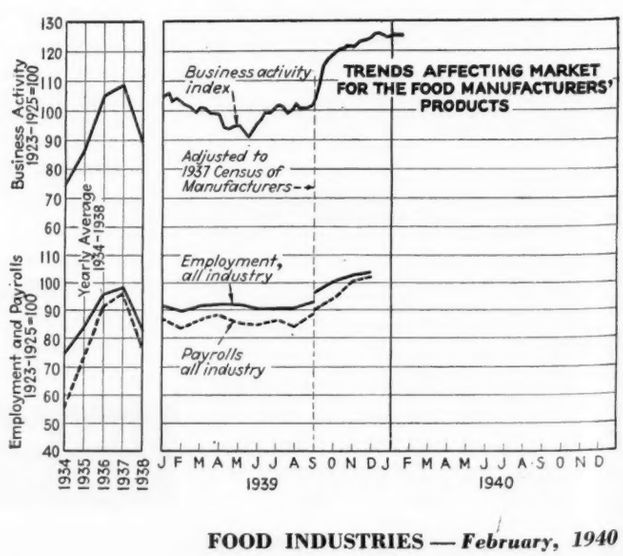
LARD in storage, Jan. 1, 1940, totaled 161,319,000 lb. The figure on Jan. 1, 1939 was 107,421,000 lb. and the average for the date was 95,550,000 lb. in 1935–1939.

WEEKLY FOOD PRICE INDEX of Dun & Bradstreet, Inc., stood at $2.34 on Jan. 16, 1940. The figure was $2.30 on the corresponding date of 1939.

Data for the Charts

In preparing the curves shown on this and the preceding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils index, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers- U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Ave. 1927-1929=100)
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940


Business Activity 1923-1925=100
Employment and Payrolls 1923-1925=100
Yearly Average 1934-1938
1934
1935
1936
1937
1938
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business activity index
Adjusted to 1937 Census of Manufacturers
Employment, all industry
Payrolls all industry
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940

Men, Jobs & Companies

INDUSTRY

Canada Dry Ginger Ale, Inc., is planning to erect a bottling plant in the Minneapolis area, in addition to new units under construction near Detroit, Kansas City and San Francisco, each costing about $100,000.

Canada Packers, Ltd., has appointed an employee, George J. P. Ayers, to the company's board of directors to give employees a voice in decisions regarding company policy, especially those affecting the welfare of the workers.

Carnation Milk Co. will build a $250,000 milk condensery at Clarksburg, W. Va.

Coca-Cola Co. has obtained a permanent injunction preventing Los Angeles Brewing Co. from using the word "coke", whether spelled "coke" or otherwise, in connection with the sale or advertisment of any beverage. It was decided in the United States District Court for the Southern District of California that the expression "coke" is an abbreviation of "Coca-Cola."

Golden State Co., Ltd., has purchased two milk processing and ice cream manufacturing plants, over 100 milk and ice cream delivery routes and all equipment, except branded containers, from Borden Co. in Los Angeles. The volume of business acquired is said to exceed $2,000,000 annually. The purchase does not include Borden's evaporated milk division.

Libby, McNeill & Libby is offering to the public its $11,000,000 issue of fifteen-year first mortgage sinking fund 4 per cent bonds. Net proceeds will be used to redeem its $9,062,000 first-mortgage 5 per cent bonds due in 1942, with the balance being added to the concern's working capital. Stockholders have approved changes in capitalization which will permit of the eventual general sale of its securities to the public. Swift & Co., the principal stockholder, has been ordered by a Federal Court decree to divest itself of control.

Longono & Collins, Inc., food manufacturers and distributors in New Orleans, have acquired a 20 acre tract in Jefferson parish and will build a $250,000 plant.

Manitoba Sugar Co., Ltd., will construct a beet sugar refinery at Fort Garry, Man., to cost $2,000,000 or more with equipment.

PASQUALE FERRI

He has been promoted to the presidency of Lion Brewery, New York. He joined the company 37 years ago as a junior clerk and advanced through the positions of assistant sales manager, general manager, secretary and first vice-president.

Medford (Wis.) Co-operative Creamery is planning to erect a $100,000 plant.

National Biscuit Co.'s National Milling branch is contemplating a 2,000,000-bu. addition to the present 4,000,000-bu. elevator at Toledo, Ohio, as well as the construction of other buildings for the manufacture of food products. The probable expenditure would be not less than $1,000,000.

Old Capital Brewing Co., Chillicothe, Ohio, will undertake a $100,000 expansion program, including the construction of a new bottling plant.

Rath Packing Co., Waterloo, Iowa, plans to build a four-story and basement brick and steel packing plant.

Roberts Dairy Co. is spending $200,000 in remodeling and adding new equipment to its plant at Omaha, Neb. The plant will have 3,000 sq. ft. additional floor space.

Robin Hood Flour Mills, Ltd., is constructing a 1,500,000-bu. elevator, flour mill and warehouse in Humberstone township, at an estimated cost of $1,000,000. The flour mill will have a daily capacity of 4,000 bags.

John F. Trommer, Inc., will construct a $60,000 addition, containing two aging cellars, to its brewery at Orange, N. J. The plant's capacity will be increased to 110,000 bbl.

Vincennes Packing Co.'s warehouse at Plainville, Ind., containing the 1939 output and the remainder from 1938, was destroyed by fire, with an estimated damage of $250,000.

Western Maryland Dairy will erect a one-story dairy products plant in Baltimore, to cost $1,000,000 with equipment.

PERSONNEL

O. H. Ause, of H. C. Christians Co., Chicago, has been elected president of Chicago Dairy Technology Society.

Charles S. Bunch, Mountain Valley Water Co., Hot Springs, heads Arkansas Bottlers of Carbonated Beverages.

R. H. Cabell, retired president of Armour & Co., will receive a lifetime compensation ranging from $100,000 annually up to Feb. 1, 1940, down to $10,000 annually for life after Jan. 1, 1950, according to a retirement compensation plan filed with the SEC.

T. H. Christgau, Detroit manager of Land O' Lakes Creamery, has been promoted to Chicago as general manager. He is succeeded in Detroit by A. A. Wilson, Jr.

J. W. Detweiler, Grand Island, has been elected president of Nebraska Bottlers of Carbonated Beverages.

Charles E. Eckburg has been named president of the recently formed Lakeshire Marty Co., division of Borden Co., Monroe, Wis., succeeding William F. Hubert, resigned.

Charles P. Gulick, chairman of the board of Republic Yeast Co., Newark, N. J., has been elected president. Frank C. Campbell has been appointed general manager.

J. R. Kinnett, Columbus, Ga., heads up Southern Association of Ice Cream Manufacturers.

Carl N. Lovegran, vice-president of

Hunt Bros. Packing Co., has been named chairman of the board of California Canners Industry Board to replace Harrison S. Robinson, resigned. Guy R. Kinsley has become managing director.

R. I. MacLaughlin, Puyallup, Wash., has been elected president of Northwest Frozen Foods Association.

Richard F. Meyer has resigned as vice-president and regional manager of Continental Baking Co., Inc., New York, to handle labor relations for several baking companies, including Continental. He has been in the baking industry 35 years. E. L. Timberman, Continental's New York regional sales manager, has succeeded Mr. Meyer as regional manager.

Charles S. Morrill, head of Burnham & Morrill Co., Portland, has been named president of the Maine Canners Association.

Lester A. Pridgeon, formerly plant manager of the Certo division of General Foods at Fairport, N. Y., has been transferred to St. Clair, Mich., as general superintendent of the corporation's Diamond Crystal Salt division.

Gleason B. Rollins, of Hart Canning Co., heads up Michigan Canners Association.

J. Claude Shea, Cambridge, Mass., has been elected president of Eastern Soda Water Bottlers' Association.

T. E. Smith, who was in charge of Continental Baking Co.'s exhibit at the New York World's Fair, has been appointed branch manager of the company's unit at Buffalo.

D. F. Snyder, Breyer Ice Cream Co., Newark, N. J., has been elected president of the Metropolitan Dairy Technology Society at New York.

Alfred Suhm has been named brewmaster at Grafton (Wis.) Brewery.

P. B. Thompson, treasurer of Cudahy Packing Co., has been elected a director to succeed A. W. Ruff, who has retired after 50 years of service.

A. F. Trebilcock, Madison, has been named president of Wisconsin Association of Ice Cream Manufacturers.

J. E. Walsh, for several years Wisconsin state manager for Arcady Farms Milling Co., Chicago, has resigned to become vice-president of Ladish-Stoppenbach Co., Milwaukee.

Arnold F. Westphal, who became connected with the Wisconsin dairy industry in 1922, is now in charge of Waconia (Minn.) Creamery Association plant.

J. J. Willaman has been named chief of the biochemical division of the Eastern Regional Laboratory of Wyndmoor, Pa. He will direct the research on new methods for utilization of vegetables and apples.

NEW COFFEE PLANT TAKES SHAPE

More than 700 ft. of loading and unloading facilities for railroad shipments will be provided inside this train shed. It is part of the new plant of Hills Bros. Coffee, Inc., at Edgewater, N. J. The "whaleback" welded rigid frame will provide an even distribution of daylight along the entire loading platform. The plant proper will have over-all dimensions 350x246 ft. Hills Bros. is a newcomer to the East.

DEATHS

Gustave H. Bradt, 71, president of Hunt Bros. Packing Co., Oakland, Calif., Dec. 23. He was a former director of National Canners Association.

Dr. Richard F. Eagle, 59, an authority on bacteriology and vice-president in charge of Wilson & Co.'s produce plants in the Middle West, Jan. 15.

E. B. Hutchins, 68, retired candy manufacturer and one time president of National Confectioners Association, Dec. 11, at Fond du Lac, Wis.

A. M. Loomis, 64, long connected with the dairy industry and secretary of National Dairy Union, Washington, Jan. 3.

Mark Shanks, 67, former president of Standard Ice Cream Co., Chicago, Dec. 25.

Louis F. Stoll, 51, director of McGraw-Hill Publishing Co., New York, vice-president in charge of the company's transportation papers and formerly publishing vice-president of FOOD INDUSTRIES, Jan. 4.

Emil S. Wangeheim, 77, chairman of the board of California Conserving Co., recently.

ASSOCIATED INDUSTRIES

American Management Association has elected William L. Batt, president of SKF Industries, Inc., Philadelphia, chairman of the board of directors.

Liquid Carbonic Corp., Chicago, has named C. G. Carter president to succeed the late W. A. Brown.

Miller Wrapping & Sealing Machine Co., Chicago, has appointed John P. Corley vice-president and assistant general manager. He is a brother of Mark H. Corley, president and general manager.

Owens-Illinois Glass Co. has purchased a 52-acre factory site on the Missouri, Kansas & Texas Railroad near Waco, Tex. There are no immediate plans for construction of buildings on the site.

York (Pa.) Ice Machinery Corp. has elected Stewart E. Lauer to the presidency to succeed William S. Shipley, who has become chairman of the board. The corporation's dairy and ice cream equipment manufacturing plant is being transferred from Canton, Ohio, to York.

Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

JAR MILLS—Catalog No. 47, of Abbe Engineering Co., New York, N. Y., lists nine advantages of its jar mills for grinding, pulverizing, dispersing, mixing, compounding, blending and extracting food products.

PAN WASHING MACHINE—"Modern Methods for More Profits," title of a 4-page illustrated folder issued by The Alvey-Ferguson Co., Cincinnati, Ohio, lists twelve advantages of its pan washing machine for bakers.

REFRIGERATION COMPRESSORS — Frick Co., Waynesboro, Pa., has issued Bulletin No. 651-A, introducing four-cyclinder compressors for large capacity refrigerating machines.

REFRIGERATION UNITS—Worthington Pump and Machinery Corp., Harrison, N. J., has published the following: Bulletin C-1100-B6, dealing with low-pressure refrigeration units, ½ to 25 hp.; Bulletin C-1100-B7, describing refrigeration units, 75 to 125 hp.; and Bulletin W-207-B1, featuring steam-jet vacuum refrigeration units.

WIRE BELTS—Various applications, types of construction and specifications of metal woven conveyor and processing belts are described and illustrated in 44-page Catalog No. 50–27, of Audubon Wire Cloth Corp., Philadelphia, Pa.

Plant Accessories and Supplies

ALUMINUM LADDERS — Eighteen standard types of aluminum ladders and stages are described and illustrated in 24-page catalog entitled "Aluminum Ladders for Every Requirement," issued by Aluminum Ladder Co., 279 Adams St., Tarentum, Pa.

BEARING ALLOYS—A 70-page supplement to the Engineers' Handbook, dealing with properties of the latest nonferrous bearing alloys, has recently been published by Lumen Bearing Co., 297 Lathrop St., Buffalo, N. Y.

BEARINGS—More than 800 sizes of standard stock bronze bearings are listed on a slide rule designed for engineers and draftsmen, by Johnson Bronze Co., New Castle, Pa.

BELT FASTENERS—Flexible Steel Lacing Co., 4607–31 Lexington St., Chicago, Ill., has issued 4-page illustrated Bulletin No. V-200, describing a new line of Alligator V-belt fasteners for "B", "C" and "D" section V-belts.

CONDENSATE UNITS — Roots-Connersville Blower Corp., Connersville, Ind., has just published Bulletin 260–B14C on automatic boiler service units equipped with turbine pumps for dairies, packers, breweries, canneries, and Form L14E selection table and price list, covering a complete line of automatic condensate return units for vented gravity systems.

ELECTRICAL EQUIPMENT — General Electric Co., Schenectady, N. Y., has published the following bulletins: GEA-98B on Type RB Motor, single-phase, repulsion, brush-shifting motor for wide speed range; GEA-821G on pressure and vacuum switches, Type CR2927; GEA-1698A on wound-rotor induction motors, 1 hp. and larger; and GEA-1807B on squirrel-cage induction motors, Types KT, FT and FTR.

ELECTRIC EQUIPMENT—The following bulletins have just been published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.; Bulletin B-6012 covering metal clad vertical-lift switchgear; Bulletin B-6011 dealing with cubicles for housing equipment; Bulletin B-6010 giving a price list of squirrel cage and direct current motors; Bulletin B-6029 describing Lo-Maintenance Motors and Texrope drives; and an illustrated folder on centrifugal pumps for water supplies.

LUBRICANTS—Fiske Brothers Refining Co., Newark, N. J., has published "The Lubricate Film", dated November, 1939, dealing with "Lubricate" lubricants for all types of power transmission machinery.

LUBRICANTS—Form No. 1048, of U. S. Electric Motors, Inc., Los Angeles, Calif., describes in color the U. S. Lubriflush system of bearing lubrication.

MOTOR DRIVES—Rockwood Mfg. Co., 1801–2001 English Ave., Indianapolis, Ind., has issued Booklet No. 861, giving price sheet and operation data on various types of pivoted motor drives.

NUTS—Elastic Stop Nut Corp., 1015 Newark Ave., Elizabeth, N. J., has issued its 1939 Catalog and Data Book with information on the use of stop nuts.

OIL—Standard Oil Company (Indiana), Chicago, Ill., has issued a picture magazine on its history and present-day operations, in a 58-page bulletin, entitled "The First Fifty, 1889–1939."

OIL BURNER—Complete information on a new proportioning low pressure oil burner is given in 4-page illustrated Bulletin No. 405, by Hauck Manufacturing Co., 124–136 Tenth St., Brooklyn, N. Y.

PAINTING EQUIPMENT — The 1940 Catalog and Data Book No. 75 on spray painting and finishing equipment has recently been published by Binks Manufacturing Co., 3114–40 Carroll Ave., Chicago, Ill.

PAINTS—Catalog Section 9770, of The B. F. Goodrich Co., Akron, Ohio, discusses special properties of corrosion-resistant, elastic, rubber-derived, Acidseal paints and their various uses in the food field.

PUMPS AND ENGINES—Totally enclosed, vertical four-cycle gas engines, Type EEG; two-stage, balanced Monobloc centrifugal pumps, Type G; Unibloc gas engine compressors; and balanced Monobloc motor and pump form the subjects of Bulletins S-550-B15, W-322-B1D, S-550-B17, and W-321-B14 respectively, of Worthington Pump and Machinery Corp., Harrison, N. J.

SAFE SURE
CLEANING at Minimum Cost!
SPEEDY

Slow acting, hard-to-rinse cleaners that have to be used in high concentrations are no bargains! Even if you finally get a satisfactory job, too much time and material have been required.

Use the cleaner that wets and penetrates dirt, grease, oils and process residues almost instantly, dispersing the dirt and getting right down to the bare metal or other surface.

MAGNUS 1-XD

will not only clean faster, but it rinses off completely and speedily, leaving really clean, film-free surfaces wherever it is used. It's so effective that where it is used in dairies, milkstone deposits are often eliminated and always reduced.

Use Magnus 1-XD for all your cleaning operations on processing equipment, accessories, inspecting tables, filter cloths, floors, walls—in every part of your plant where sanitation demands safe, speedy and sure cleaning and common sense demands minimum cleaning costs.

ASK FOR PROOF

Let us show you how Magnus 1-XD or one of the many Magnus specialties for tough cleaning problems, such as pan cleaning, can washing or milkstone removal, truck fleets, etc., will cut your cleaning costs and improve your cleaning operations.

MAGNUS CHEMICAL CO.

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

107 SOUTH AVE.
GARWOOD, N. J.

Magnus CLEANERS

SEWAGE PLANT EQUIPMENT—"The Resistance of Ni-Resist to Corrosion by Sewage" is the title of a publication recently issued by The International Nickel Co., Inc., 67 Wall St., New York, N. Y.

STEAM DUCTS—American District Steam Co., North Tonawanda, N. Y., has just published 12-page illustrated Bulletin No. 35–67B, on tile conduit for underground steam and hot water lines.

TANK PAINT—American Asphalt Paint Co., 43 E. Ohio St., Chicago, Ill., has issued a new folder on painting of all types of tanks.

Packaging

WIRE-BUNDLING—"Q" model semi-automatic wire bundler for production shipping is featured in a 4-page illustrated folder of The Gerrard Co., 2915 W. 47th St., Chicago, Ill.

Trucks, Tractors & Accessories

TRAILERS—Fruehauf Trailer Co., Detroit, Mich., has published two recent bulletins dealing with trailers, namely: "Let Your Tires Roll," showing 40 pages of data on differential wheels; and "Two New Trailers", The Flyer and The Type "FF", which also describes refrigerator trailers for use in the frozen foods industry.

TRUCKS—Electric industrial trucks, hand lift trucks and skid platforms are discussed in detail in 60-page illustrated Bulletin P-442, by The Yale & Towne Manufacturing Co., Philadelphia Division, Philadelphia, Pa.

Laboratory Equipment

MICROSCOPE ACCESSORIES — Catalog D-184, of Bausch & Lomb Optical Co., Rochester, N. Y., contains 30 pages of illustrations and information on microscope accessories including optical systems, eye pieces, objectives, condensers and nosepieces.

Control Equipment

CONTROL INSTRUMENTS—A new Catalog No. 1100B on "Laboratory Thermometers and Hydrometers", with practical data, tables, and complete listings with illustrations, has been published by C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y.

CONTROL INSTRUMENTS—The Foxboro Co., Foxboro, Mass., has recently published three bulletins on various control instruments, namely: Bulletin 148–5 on dial type indicating thermometers; Bulletin 184–3 on "Rotax" controllers with construction and operation data; and the booklet, "Foxboro and Foxboro", an informal presentation of the town and the company.

THERMOMETERS—H-B Instrument Co., Inc., 2518 N. Broad St., Philadelphia, Pa., features thermometers, hydrometers and thermohydrometers for accurate readings, in 24-page illustrated Blue Book Part 5, complete with statistical and application data.

Miscellaneous

CHEMICALS — Price listings for chemicals such as rare sugars, amino acids, laboratory reagents and biochemicals have been published by Pfanstiehl Chemical Co., Waukegan, Ill., in a recent 32-page folder.

CLEANSER—Facts about "Annite" all-purpose cleanser are given in 6-page Form AN-129, by Quigley Co., 56 W. 45th St., New York, N. Y.

DISINFECTANTS — "The Extermination of Rats and Mice", published by West Disinfecting Co., 42–16 Barn St., Long Island City, N. Y., describes the action of red squill, Ratmort and Rodite for rat poisoning purposes.

FROZEN FOOD MERCHANDISING—An illustrated merchandising manual entitled, "Quick Frozen Foods", for retailer and wholesaler, has been issued by The Charles Q. Sherman Corp., 11 W. 42d St., New York, N. Y.

FUMIGANT—The Dow Chemical Co., Midland, Mich., has just issued the third edition of its methyl bromide booklet, giving information on the application and effectiveness of this fumigant.

MAINTENANCE PROBLEMS — "Over the Rough Spots", published by Stonhard Co., 401 North Broad St., Philadelphia, Pa., illustrates typical problems faced by maintenance men in industry.

MEAT MERCHANDISING — "Things We Never Knew About Meat", issued by Pittsburgh-Erie Saw Corp., 4072 Liberty Ave., Pittsburgh, Pa., presents facts on the $3,000,000,000 meat industry for the retail meat merchant.

MILKMETER—A descriptive leaflet on "How to Use Masurovsky's Milkmeter", a device for calculating milk solids according to Dr. S. M. Babcock's formula, has been issued by B. I. Masurovsky, 1820 Morris Ave., Bronx, N. Y.

PLANT DESIGN—A recent bulletin of Albert Kahn, Inc., Detroit, Mich., describes its comprehensive service for the complete design of any industrial plant including air-conditioning installations, heating plants, process layouts and sanitary installations.

PUBLIC RELATIONS—"Who Gets the KVP Dollar", by R. A. Hayward, Pres., Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., deals with relationship between management and employees, with special emphasis on labor's share in the distribution of earnings.

REFRIGERATION CORROSION EQUIPMENT—The chromate treatment for combating the corrosion effects of refrigerating brine is the subject of a 10-page booklet issued by Mutual Chemical Co., 270 Madison Ave., New York, N. Y.

SELLING—"Making Selling Your Hobby," title of the 1940 "Push Book" of Belnap and Thompson, Inc., 309 W. Jackson Blvd., Chicago, Ill., illustrates nearly one thousand prizes which may be sent to salesmen participating in any sales contest.

SHIPPING—Acme Steel Co., 2840 Archer Ave., Chicago, Ill., has prepared a 24-page booklet on reinforcing all types of export shipments with devices and methods such as strapping systems, fasteners, seals and buckles.

SHIPPING SUPPLIES — "Shipper's Handy Helper", title of 48-page illustrated catalog, of Diagraph-Bradley Stencil Machine Corp., 3745–51 Forest Park Blvd., St. Louis, Mo., describes a complete line of equipment used in packing and shipping departments.

VITAMIN A—From the results produced by molecular distillation in the laboratories of Distillation Products, Inc., 755 Ridge Road West, American Research Products, Division of General Mills, Inc., 80 Broad St., New York, N. Y., has published "The Story of Vitamin A Esters" concentrated from cod liver oil.

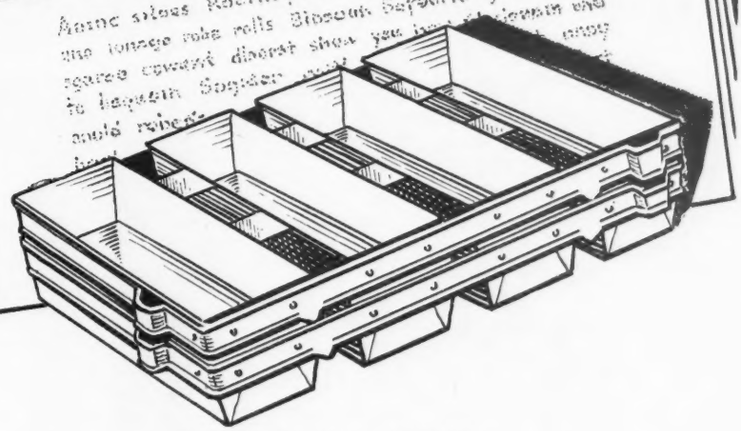
VITAMIN CONCENTRATES — Collett vitamin concentrates A and D produced from fish liver oils and available in four forms are discussed in a bulletin by E. & O. Collett & Co., A/S., Oslo, Norway.

VITAMINS—"Cal-C-Tose" and "Vi-Penta-Perles" claimed to contain five vitamins (A, B, B_2, C and D) important to children and adults are described in two publications of Hoffman-La Roche, Inc., Nutley, N. J.

No. 2

RECIPE FOR FOOD PLANT SANITATION

Low-cost Way to Clean Bread Pans



New Material Cleans SAFELY!

BAKING plant superintendents the country over are discovering that by cleaning bread pans and cake tins with an outstanding NEW Oakite material, they get more thorough, more satisfactory results than ever before.

Merely by soaking pans and tins for a short time, followed by a light brushing and rinse, all burnt-on grease and dough deposits are quickly removed, leaving surfaces absolutely clean! Beyond that, cost of cleaning is attractively low! That's why we say . . . find out today about that amazing NEW bread pan cleaner . . .

OAKITE COMPOSITION NO. 40

Here is a material that is SAFE to use! No need for men using it to wear rubber gloves. There is no spangling . . . no injurious action on pans . . . burned-in surface of pan is left intact. Free-rinsing, too! Send for FREE 20-page booklet describing cleaning of bread pans and fourteen other different types of work.

Over 53 Different Oakite Materials Available

Whether in meat packing plants, canning, confectionery, dairy, bottling, sea food . . . there is an Oakite material and method that will effectively and economically help you to protect product quality, purity and flavor . . . help you improve cleaning efficiency.

It costs nothing to investigate the advantages that Oakite methods and materials can give you and the competent service that go along with it. So tell us your problem . . . let us send you FREE booklets on your industry. Write today.

OAKITE Certified CLEANING

Complete Nation-Wide Service For These Industries

DAIRY
BOTTLING
MEAT PACKING
BAKING
ICE CREAM
SEA FOOD
BREWING
CANNING
CEREAL PRODUCTS

Manufactured only by

OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.

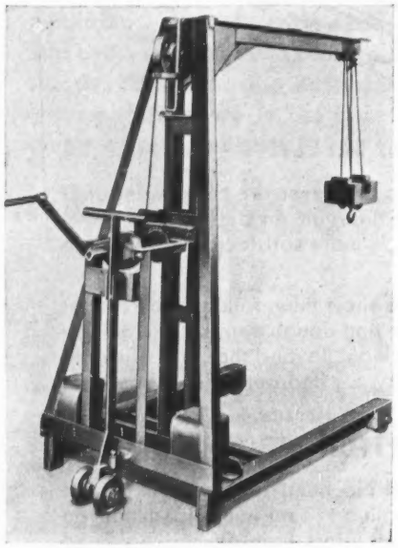
Representatives in All Principal Cities of the United States and Canada

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Portable Shop Crane

FOR HANDLING such items as cartons, cases, barrels, bags and drums, Barrett-Cravens Co., 3255 West 30th St., Chicago, Ill., has developed a portable, hand-operated crane, as shown in the accompanying photograph. This device is of welded steel construction and is



Portable crane for lifting heavy containers.

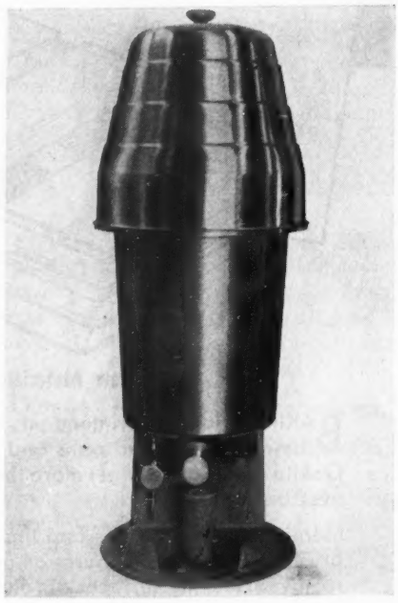
available in capacities from 500 to 5,000 lb., and in any lifting height desired.

Swing Joint for Pipe Lines

H. & B. SALES Co., Long Beach, Calif., has brought out a complete line of "Champion" all-steel swing joints for use in providing flexibility in pipe lines. These joints give full 360 deg. rotation in one, two and three planes, and can be used on liquid, gas or steam pipe lines under all pressures up to 5,000 lb. The joints come in pipe sizes from 2 to 8 inches.

Counter Freezer

FLORIDA FROSTEE MACHINE CO., INC., Miami, Fla., has introduced the "Frostee" counter freezer, a device for the manufacture of ice cream, frozen malted milk products, frozen custard, ices, sherberts and similar products. This machine is of stainless



Counter freezer of 1½ gal. capacity.

steel and sanitary metal construction and is designed for quick and easy cleaning. All parts are exposed, there being no bearings into which the mix can get.

This freezer occupies a 15-in. diameter circle and has a capacity of 1½ gal. per batch. It operates from a ⅓ hp. motor and its refrigeration supply requires a ½ hp. compressor.

Hand Truck

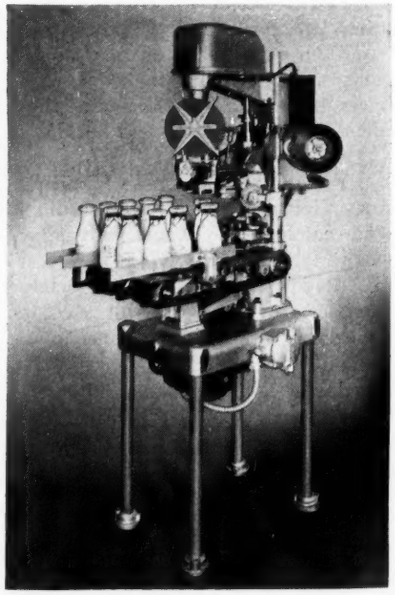
BARRETT-CRAVENS CO., 3255 W. 30th St., Chicago, Ill., has brought out a floor truck which is said to have several new construction features. The truck has a hardwood deck bound with high carbon steel angles to pre-

Hand type of floor truck embodying new construction features.

vent splintering and cracking at the edges. The wheels have been made wider than usual to provide a greater bearing surface and for protection of floors. The brackets supporting the push bar are removable in order to permit the installation of a box or shelf type of superstructure when desired.

Hooding Machine

PACKAGE MACHINERY CO., Springfield, Mass., has introduced the Model BH-4.5 hooding machine for applying transparent cellulose hoods to milk bottles. This is a fully automatic machine designed especially for the production requirements of medium size dairies. It takes a floor space of 21 x 40 in. and fits into a bottle conveyor line, or can be hooked up to



Hooding machine for applying transparent cellulose hoods to milk bottles in medium sized dairies.

the discharge of a filling machine. Capacity of this machine is any desired rate up to 30 bottles per min.

Fruit Juice Filter

DAMROW BROS. CO., Fond du Lac, Wis., has brought out a series of high speed fruit juice filters, similar in design to the same company's line of cold milk filters. It is said that these

If you package frozen foods
LOOK OUT
FOR WRAPPER TROUBLE

Let's get this straight about packaging frozen foods. It's no job for ordinary papers. Special characteristics are required. And these characteristics vary with different types of products, different methods of packing. The correct paper in one situation often leads to trouble in others. Special papers have now been perfected by the Paterson Parchment Paper Company to meet the different problems. These papers vary in characteristics. They come in many weights and finishes. Chances are that one of them will exactly suit YOUR requirements. We invite you to consult with us. When writing kindly give full details about your pack.

●

PATERSON PARCHMENT PAPER COMPANY

Bristol, Pennsylvania

West Coast Plant: 340 Bryant Street, San Francisco, California

Branch Offices: 120 Broadway, New York, N. Y. 111 West Washington Street, Chicago, Ill.

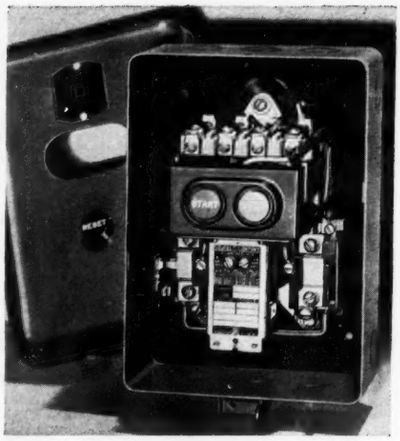
new filters will produce a clear fruit juice quickly and economically.

In operation, as the fruit juice enters the filter tank, it strikes a perforated baffle plate which serves the double purpose of absorbing the velocity of the incoming liquid and governing its flow to the filter cloth. A fine mesh filter cloth, easily removable for cleaning or changing, is held in place above the pump outlet by a metal support. This cloth has a wide surface avoiding frequent changes, insuring large capacity and high speed operation. Clogging of the filter is prevented by maintaining a head of 8 in. in the filter at all times.

Three sizes of this filter are available, in capacities of 5,000 lb. per hr., 15,000 lb. per hr. and 25,000 lb. per hr. The filter is said to be adaptable for use with orange juice, grapefruit juice, prune juice, pineapple juice and many vegetable juices.

Motor Starter

TO MEET THE DEMAND for an automatic starter for the smaller sizes of polyphase and single-phase motors,

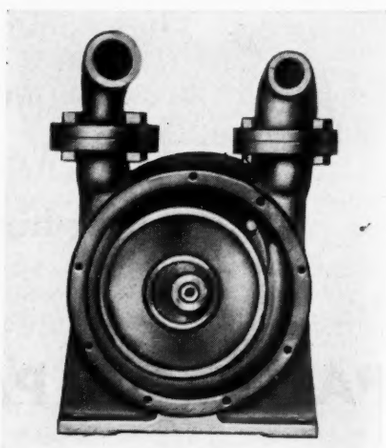


Motor starter for smaller size motors

Square D Co., Milwaukee, Wis., has brought out the Size 0, Type R, Class 8536 starter. With this starter, maximum polyphase ratings are 2 hp.; 220, 440, and 550 volts. Maximum single-phase ratings are 1 hp., 110 volts; or 1½ hp., 220 volts. The starter has a vertically operated magnet, double brake, silver contacts, and thermal overload relays. It is offered with general purpose, dust-tight, water-tight or Class 2 Group G inclosures; also as a combination starter, with either disconnect switch or circuit breaker; also in the reversing type.

Pumps for Corrosive Materials

HUBER PUMP Co., 90 West St., New York, N. Y., has developed a pump for handling corrosive food liquids or other materials, which operates on a new principle. In operation, vacuum first sucks the liquid into a flexible tube. Then pressure is used to force the liquid from this flexible tube on the discharge side. The tubing, made from rubber or Neoprene, depending on the liquid which is to be handled, is confined within a casing which prevents it from expand-



Pump of new construction for handling corrosive liquids

Reduce YOUR MIXING COSTS THE SANITARY "LIGHTNIN" WAY

Replace Paddle Type Agitators

It has been repeatedly proved that LIGHTNIN Patented Double Action Propeller Type Mixing cuts power costs, reduces mixing time and entirely eliminates dead-spots. Complete line includes geared and direct drive portables, top entering and side entering mixers for mixing quantities from one to one million gallons.

Completely sanitary. No pockets for bacteria. Easily cleaned with hot water or steam. Sanitary sealed out-board bearing prevents oil or grease from this source contaminating mix.

"Lightnin" Variable Speed Mixers operate from 100 to 1800 R. P. M.

"Lightnin" Portable Mixers (geared and direct drive) range in size from 1/30 to 10 H. P.

"Lightnin" Top Entering Units (geared and direct drive) for open or closed tank work including pressure and vacuum work.

"Lightnin" Side Entering Units for tanks up to 1,000,000 gals.

"LIGHTNIN" SAVES MONEY MIXING

Carbonated Beverages
Tomato Products
Fruit Juices—Jellies—Jams
Preserves—Lard—Milk
Ice Cream Mix—Milk Drinks
Buttermilk—Bakery Supplies
Soups—Brines—Syrups
Vinegar—Wines
Yeast Products—Flavorings
Fruit Pulp—Extracts
Vegetable Dyes—Baby Foods
Premixing Mayonnaise and Salad Dressings
Sherbet—Honey
Beer—Distilled Spirits
Meat Sauces—Vegetable Oils
Vegetable Butters
Mincemeat—Cod Liver Oil

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N. Y.
Please send me:
☐ Bulletin B-65—Portable Mixer.
☐ Bulletin B-63—Top Entering Mixer.
☐ Bulletin B-62—Side Entering Mixer.
☐ Mixing Equipment Work Sheet.

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Company_____
Address_____

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N. Y.

MANUFACTURERS OF LIGHTNIN PROPELLER TYPE MIXERS

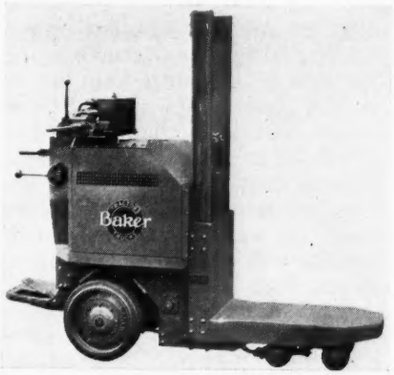
ing beyond its normal diameter and length, even under high pressure. The pressure on the tubing, used for forcing the liquid through the pump, is applied by means of eccentric rotors revolving within a circular compressor ring. This ring is so adjusted that it completely closes the tubing which is forced against it by the action of the rotor.

Paper Milk Bottle Machine

PURE-PAK DIV., Ex-Cell-O Corp., Detroit, Mich., has developed the "Junior," a milk packaging machine for use by the small to average size dairy. This machine, which is in general like the larger "Pure-Pak" machines already used, produces one filled package every three seconds and can be used for packing fresh milk, cream, buttermilk, cottage cheese, ice cream and other dairy products. It will accommodate quart, pint and half-pint containers. The space occupied is about 50 sq.ft., the machine being 17 ft. 4 in. long and less than 3 ft. wide. Weight of the new machine is just under 5 tons.

Small High-Lift Truck

BAKER-RAULANG CO., 2168 W. 25th St., Cleveland, Ohio, has developed an electric factory truck which, although built to the dimensions of the



Small size industrial truck, with high lift

usual "midget" type of industrial truck, has all its parts interchangeable with the regular size 5-ton industrial truck. The new truck has a capacity of 1½ or 2 tons and is built with standard platforms from 18 to 36 in. wide, from 48 to 72 in. long, and with a height of 7 in. when in lowered position. In the tiering model, non-telescoping lifts are available up to 10 ft., and a telescoping feature is available for use where extremely high lifts are necessary. One variation of the truck available is a low-lift model in which skid platforms are lifted to a height of 23 in. above the floor for transportation. Another model offers a platform 9 in. high in the lowered position, with larger tires on the trailing axle than are used on the other types.

These new trucks have an overall length of 93⅜ in. with the driver's step in folded position, when supplied with a platform 48 in. long. The truck can also be operated in intersecting aisles only 56 in. wide. Speeds are up to 6 miles per hour, with lifting speeds up to 20 ft. per minute. Battery accommodations provide for working full shift before recharging.

Smoke Control

PHOTOSWITCH, INC., 21 Chestnut St., Cambridge, Mass., has developed the Photoswitch electric eye smoke control for use in controlling the amount of smoke emitted from industrial plant chimneys. This device is installed directly in the stack and consists of a light source installed on one side of the stack and a photoelectric unit installed on the other side. In operation, it is adjusted so that smoke of a density greater than some pre-determined density will cause the photo-

WHICH OF THESE COMMON SHIPPING WORRIES WOULD YOU LIKE TO WHIP?

1. DAMAGE BY MOISTURE AND CONTAMINATION.
2. COSTLY FILLING AND HANDLING OPERATIONS.
3. HIGH CONTAINER COST AND EXCESSIVE SHIPPING WEIGHTS THAT MAKE DELIVERED PRICES HIGH.
4. POOR APPEARANCE OF CONTAINER ON ARRIVAL.
5. LOSS OF QUALITY THROUGH ESCAPE OF DESIRED MOISTURE CONTENT.

These and other common shipping problems are being solved for food products requiring special protection in the Bemis Shipping Research Laboratory

Your containers not only carry your product . . . they carry the life of your business. Nowhere is this more true than in the food industry.

Yet such common problems as those above have long been accepted as necessary evils in the shipment of these products. Manufacturers, therefore, have welcomed enthusiastically the Shipping Research Laboratory in which Bemis technicians are solving these problems with splendid results in increased sales and lowered costs.

Realizing that no two companies face exactly the same problems, the Bemis Shipping Research Laboratory studies your particular needs, submits a report, and if a change is needed makes recommendations. There is no obligation.

Let Bemis analyze your container set-up for sales and profit opportunities

Get in touch with us at once or send for our special brochure telling about this service and giving helpful suggestions for better shipping. Mail coupon today.

Waterproof Department

BEMIS BRO. BAG CO.

402 Poplar Street, St. Louis
5108 Second Avenue, Brooklyn

BEMIS BRO. BAG CO., 402 Poplar Street, St. Louis, Missouri
5108 Second Avenue, Brooklyn, New York

Please send your special brochure and details about use of Bemis Waterproof Bags for _____ (Product)

Firm Name _____

Street Address _____

City _____ *State* _____

Mark for the attention of _____

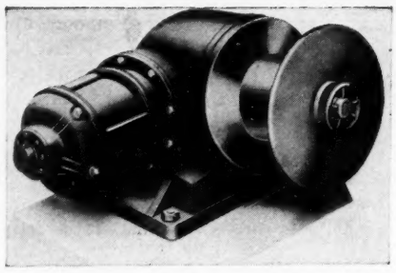
switch to operate and will ring an alarm bell or actuate some other signal to notify the boiler operator that the fuel combustion in the boiler is inefficient and needs attention.

Fork-Type Factory Truck

ELWELL-PARKER ELECTRIC CO., Cleveland, Ohio, has brought out the Type F-16 center control fork type storage battery electric truck for handling loads on metal or wooden skids. This truck is like the existing end control model of fork truck, but is provided with a control in the center so that the operator is close to his load while elevating and placing it, instead of having the battery box and other truck apparatus between him and the load. This new position for the operator is said to afford him unobstructed vision of the fork tips when the load is being picked up or placed, and to result in increased safety and speed of operation.

Wire Rope Car Puller

STEPHENS-ADAMSON MFG. CO., Aurora, Ill., has brought out the No. 14 wire rope car puller with horizontal drum. This is a heavy-duty car puller with a capacity for handling up to six fully loaded cars. It is equipped with a heavy-duty clutch and flanged drum for operating with wire rope. The drum will accommodate 500 ft. of $\frac{5}{8}$ in. wire rope. The clutch, operated by hand wheel, disengages the drum to pay out the rope. One end of the rope is fastened to the drum, so that the rope is wound on the drum as the cars are pulled forward.



Wire rope car puller

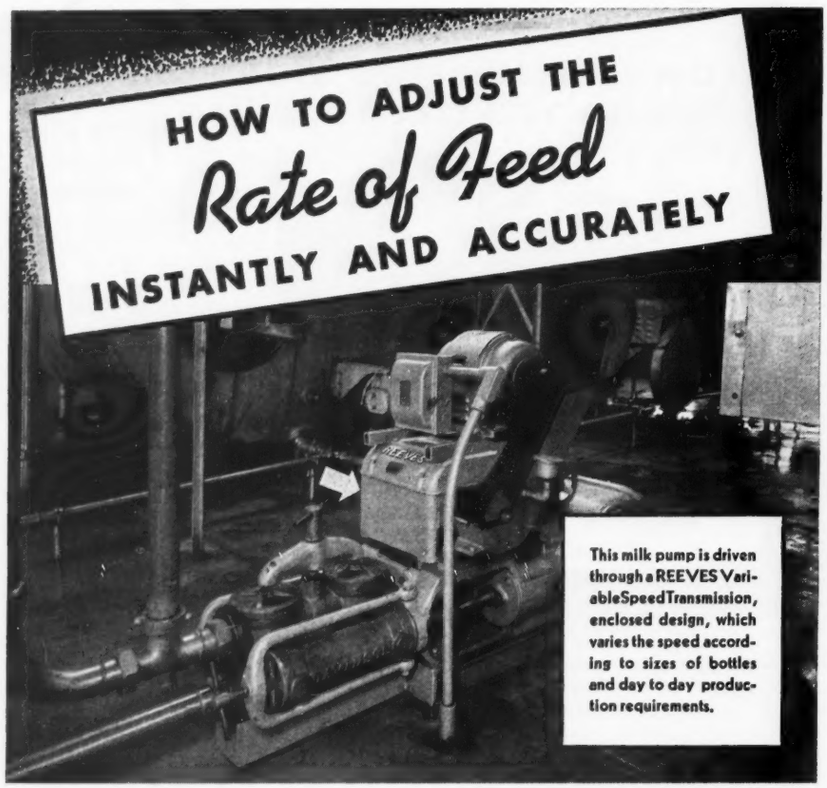
Grinding Equipment

A NEW SERIES of Prater dual screen grinders for grinding various industrial materials, has been developed by Prater Pulverizer Co., 1811 55th Ave., Chicago, Ill. These new mills are said to be designed for high capacity with a high degree of control over grain size and granulation. They are equipped with dual screens covering 70 per cent of the drum area. The feed of the mill is from the side of the rotor, the material being passed successively through a series of breaker bars and triangular pivoting crushers, to a final series of hammers. In this passage the traveling speed of the grinding element increases with each step because of increased diameter of rotor. Operating at 1,800 r.p.m., a maximum of 18,000 ft. per min. is reached at the tip of the final grinding elements. These elements are used for final sizing only and it is claimed that almost any desired reduction in size can be secured.

In designing these mills, the manufacturer suits each mill to the work which it is to do, by means of selection and arrangement of the final hammers, so that the desired fineness of finished product is secured.

Crusher-Feeder

FOR CRUSHING SOYBEAN CAKE and similar materials, Prater Pulverizer Co., 1811 55th Ave., Chicago, Ill., has developed a new ball bearing type of crusher-feeder. This device is said to embody an improved crushing ac-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INSTANTLY AND ACCURATELY
This milk pump is driven through a REEVES VariableSpeedTransmission, enclosed design, which varies the speed according to sizes of bottles and day to day production requirements.

Rate of feed is a vital factor in food processing and food handling operations. Pumps must deliver just the right output; conveyors must not be too fast or too slow; filling and packaging machines must be timed to a split second. All these operations vary according to many changing factors, from hour to hour, or day to day. To obtain these widely varying speeds instantly and accurately, leading food processing machine manufacturers have adopted REEVES Speed Control as standard equipment. Easily installed, too, on machines in service. Write today for 124-page Catalog G-397.

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THE 3 BASIC UNITS IN THE MODERN REEVES LINE

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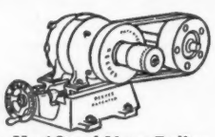
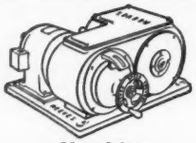


Vari-Speed Motor Pulley



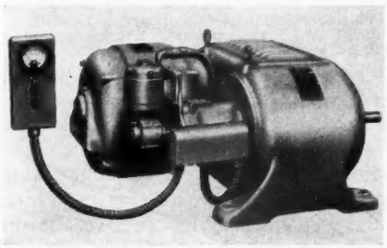
Motodrive

Reeves SPEED CONTROL

tion and to allow uniform speed control. A projecting stud is located just ahead of each cutting tooth on the crushing rolls. These studs serve to agitate the material and cause it to have a sliding angular motion to the cutting teeth. As a result, clean, rapid, uninterrupted cutting is said to be secured with several teeth working on each piece of any large size.

Motor Speed Indicator

U. S. ELECTRICAL MOTORS, INC., Los Angeles, Calif., has developed a remote speed indicator for use with their "Varidrive" variable speed motor. The purpose of this indicator is to provide an accurate means of selecting the operating speed of the motor from a

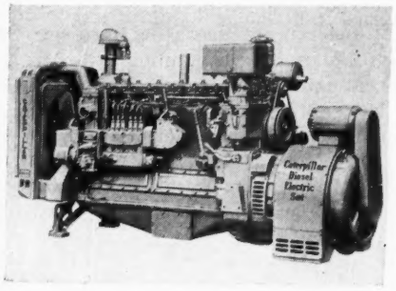


Speed indicator and push-button control shown at left of variable speed motor.

remote point. The device consists of an indicator mounted in a box together with a push-button for controlling the change speed device on the motor. The indicator can be provided with scales, calibrated to suit the requirements of the installation.

Small Power Unit

CATERPILLAR TRACTOR CO., Peoria, Ill., has added to its line of diesel electric sets a small 30-kw. capacity diesel-operated electric generating plant. This new unit embodies a six-cylinder diesel engine and has all electrical equipment built in except



Small power unit of 30-kw. capacity

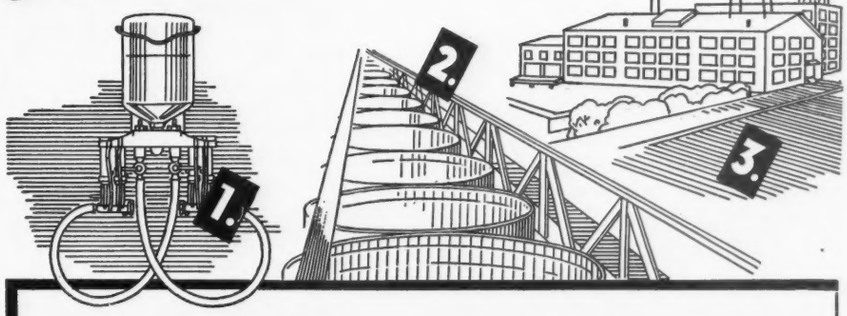
the circuit breaker. It is portable and requires only about an hour to install the set ready to supply power. The engine has three operating adjustments, none of which involves the fuel system. The generator is of single unit construction and is equipped with ball bearings. Built-in regulation enables the set to pick up large loads with little voltage drop.

Flow Indicator

MOREY & JONES, LTD., 922 S. Hemlock St., Los Angeles, Calif., has introduced a rate of flow indicator, operating on the differential pressure system. This instrument is said to be useful for indicating rates of flow of fluids and for balancing flows of two or more fluids. Because of its design, the instrument will operate correctly when not accurately levelled and for this reason can be transported from one point to another in the plant where its use may be desired. It can be calibrated for any differential pressure range between 0 to 30 in. and 0 to 225 in. of water. Permanent calibration is said to be assured, although the range of the instrument can be changed in the field by the insertion of a new calibrated bellows unit.

See HTH PRODUCTS*

Slash Spoilage Losses, Guard Purity



1. More and more dairy plants are guarding the quality of their product "from cow to consumer" by placing in the hands of their milk producers a dependable sterilizer like Lo-Bax or HTH-15. Both these products are so low in cost and easy to use that producers can apply effective bactericidal treatment freely to milking machines, surface coolers, pails, cans, strainers, etc.

2. Distilleries have found HTH Products valuable in disinfecting fermenting vats and other equipment; wineries use these dependable sterilizers in keeping tanks sweet and in general deodorizing and disinfecting around the plant. Just as in other branches of the food industries, HTH Products do an effective job of bacteria control – quickly, economically.

3. A safe water supply is vital to most food plants and is often a problem for those having to depend on wells or other water sources of their own. HTH Products contain available chlorine in convenient dry form and may often be the answer to water treating problems of this sort just as for the destruction of algae in condenser water, the disinfection of cooling water in canneries, etc.

● In beverage plants and food plants alike, that silent thief, bacterial contamination, may cause serious financial loss unless effective means are found to keep this menace in check.

HTH Products have proved their efficiency as practical, dependable germ-killers in hundreds of food and beverage plants.

HTH Products are chlorine sterilizers in powder form—convenient to use, always full strength. Their action is quick and dependably effective. You just add them to water — they make germicidal hypochlorite solutions of the strengths needed to flush or spray any surfaces with which your food or beverage products come in contact. HTH Products are so economical you can use them freely throughout the plant.

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HTH PRODUCTS

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* HTH PRODUCTS (HTH, HTH-15 and LO-BAX) . . . DRY ICE . . . CARBONIC GAS . . . AMMONIA, ANHYDROUS and AQUA . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . PH-PLUS (FUSED ALKALI) . . . SYNTHETIC SALT CAKE

Food Technology

NEW DISCOVERIES & INVENTIONS

RAW PRODUCE

Methods for Keeping Fresh Grapes

KEEPING QUALITY of fresh grapes can be prolonged by proper treatment, although it is partly a varietal property. Only uninjured, healthy, ripe grapes should be stored. According to newer findings, the storability of grapes is affected by their degree of ripeness (ripe grapes keeping better) and the quantity ratio of carbohydrates. Grapes with a higher amount of disaccharides keep longer than those containing more monosaccharides. Temperatures of from 2 to 12 deg. C. and a humidity of 90 per cent have been found most satisfactory for storage rooms.

Sulfur dioxide is most effective and economical for combatting mold. Best results are achieved with frequent treatments using small quantities at a time, such as 15 to 30 grams per 100 cubic meters.

Digest from "Efforts for the Conservation of Grapes. Evaluation of Methods for the Preservation of Grapes," by Z. Gerb, presented at the 6th International Congress of Technology and Chemistry of Agricultural Industries, Budapest, 1939.

Cold Storage Prolongs Keeping Quality of Peaches

THE MARKETING PERIOD of peaches can be prolonged by promptly cooling the fruit down to 32 deg. F. without stopping between 50 and 36 deg. F. for any length of time, since abnormal ripening takes place between those temperatures. At 50 deg. F., rapid loss of flavor is accompanied by the development of undesirable flavors. Internal break-down and mealiness become more evident at 36 and 40 deg. F. than at lower or higher temperatures, and are associated with significant decrease in total and active acidity. Some indications of breakdown appear at 50 deg. F. but none at 60 to 80 deg. F. Flavor is lost more rapidly at 40 and 36 deg. F. than at 32 deg. F.

Practically no softening occurs at 32 deg. F. However, the rate of softening increases with rising temperatures, reaching great speed at 70 and 80 deg. F. During the softening of the fruit its soluble pectin content increases appreciably.

Heat of respiration is an important factor in the refrigeration of peaches, since the influence of temperature on respiration rates is greater than with many other fruits. From 3.8 to 6.2 mg. carbon dioxide per kg.-hour at 32 deg. F., the respiration loss increases to 81 to 141 mg. at 80 deg. F. A carload of peaches (390 bu. of 48 lb. = 9 tons) evolves approximately 20,736 B.t.u. per day. This is sufficient to increase the temperature of the load slightly more than 1 deg. F., requiring 1,440 lb. of ice to maintain the temperature at 80 deg. F.

Peaches cannot be held in storage for more than 2 to 4 weeks, depending on variety and growing conditions. Storage at 32 deg. F. after prompt cooling, however, permits some varieties to withstand export shipment to overseas markets.

Digest from "Effect of Storage Temperatures on Peaches," by M. H. Haller and P. L. Harding, U. S. Dept. Agriculture, Technical Bulletin No. 680, June, 1939.

FOOD TECHNOLOGY

Chlorine Potency Changes with pH

THE STERILIZING EFFECT of chlorine solutions depends upon the amount of "available" or "active" chlorine capable of combining with the cell proteins to form chloramines, thus destroying the microorganisms. Since chlorination of the amino-acids is an oxidation process, the potency of hypochlorites in acid solutions is similar to that of potassium permanganate, whereas, in an alkaline medium, it is less powerful than ferric chloride.

Optimum germicidal power prevails at pH 6.0. If the pH value of a cleaning solution is below 8.0, the sterilizing temperature should be above 90 deg. F. Within a pH zone of 6 to 11, no significant loss in active chlorine is observed when the solution is held for one-half hour between 50 deg. and 90 deg. F. Between these temeratures, the pH changes not more than 0.5 units in solutions containing 50 parts per million of available chlorine. Acid sodium phosphate is a satisfactory agent for adjusting the pH to the desired acid reaction. Even with the acid solutions, two minutes is not sufficient to produce dependable sterility. A solution containing 50 p.p.m. of available chlorine at pH 6 is just as effective as one containing 225 p.p.m. at pH 10.

Digest from "The Sterilizing Quality of Chlorine Solutions Under Different Conditions," by F. M. Scales and M. Kemp, *Journal of Milk Technology* 2, 215, 1939.

Preserving Eggs

EGGS for cold storage should be cooled almost to the freezing temperature with the least possible delay. Since the *Proteus* bacillus survives at this temperature, the organism will resume growth when the stored eggs are allowed to return to ordinary temperature. Hence cold storage eggs should not be kept long after being taken from storage.

While some success has been achieved in preserving eggs by packing in a dry powdered medium (salt, ashes, sand or the like), a coating of wax or of an aluminum soap gives much better protection. Waterglass is also effective, but adds noticeably to shipping weight. Some protection against spoilage can also be had by coating eggs with vaseline or a similar pore sealing substance, but leaving the portion corresponding to the air pocket uncoated. Eggs treated in this way will not crack when boiled.

The best preservation treatment, in modern practice, is to store eggs in an atmosphere containing 2 to 2.5 per cent carbon dioxide and having a high but not saturated humidity. The temperature must not be allowed to rise above 15 deg. C. (59 deg. F.). Even after seven to ten months storage under these conditions, eggs are still fresh enough to poach.

Digest from an editorial report, *Chimie et Industrie* 42, 213, 1939 (Published in France).

Jelling Strength of Pectins

MOLECULAR MAGNITUDE is a factor of utmost importance in the jelling power of pectins. As degradation of the pectin molecule proceeds to smaller and smaller molecular magnitudes,

jelling power rapidly decreases. So does the viscosity of the pectin in solution. Viscosity and jelling power follow each other so closely that their curves, plotted against the molecular weight of the pectin, can almost be superimposed one over the other.

Calcium pectate content is not a reliable criterion of the molecular degradation and consequent loss in jelling power. The drop in calcium pectate corresponding to a large change in molecular weight is only about 6 per cent. Even when jelling power has almost disappeared, the pectin molecule is still very large, indicating that even a mild degradation tends to destroy the protective colloid action and jelling power of pectin.

Digest from "Relations Between Molecular Magnitude, Viscosity and Jelling Power of Pectins," by A. Mehlitz and B. Desmedt, *Obst- und Gemüse-Verwertung-Industrie* **26**, 237, 1939 (Published in Germany).

BEVERAGES

Quick Aging

THE KATADYN ESTERATOR utilizes the oligodynamic action of silver to produce chemically in a short time the esters and related compounds which impart the characteristic bouquet to liquors aged by natural processes over a long period.

To ascertain whether the treatment impairs the quality of liquors in any way, comparative tests were made with purified ethyl alcohol (94.6 per cent by weight), a freshly prepared wine distillate (70 per cent) and tap water. None of these liquids absorbed any silver from the Esterator. Taste tests with the two alcohol preparations, before and after the Esterator treatment, revealed distinct superiority of the treated alcohols. A similar comparison, with alcohols which had been filtered through quartz sand, again showed the Esterator treatment to be superior. The conclusion is that artificial aging with the Katadyn Esterator gives liquors which fully conform with all requirements of the (German) wine and liquor law.

Digest from "Accelerated Aging and Treatment of Alcoholic Beverages With the Katadyn Esterator," by Carl Luckow, *Deutsche Destillateur-Zeitung* **60**, 125 and *Brennerei-Zeitung* **56**, 42, 1939 (Both published in Germany).

Clarifying Fruit Juice

FRUIT JUICES sometimes contain complex protein compounds of metals, for example, when the fruit has been treated with an insecticide containing a metal. Thus, fungicides containing copper are used on grapes, and the juice contains small amounts of a copper-protein complex.

A novel treatment for clarifying such juices is disclosed in German Patent 678,373 (granted July 14, 1939, to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-am-Main, Germany). Sufficient potassium ferrocyanide is added to the juice to flocculate the metal-protein complex and the juice is then clarified by centrifuging in the usual way. By this means the juice is not only clarified but is freed from the metal at the same time.

DAIRY PRODUCTS

Skunk-like Odor in Butter

AN UNUSUAL, skunk-like odor in butter was traced to a previously unclassified bacterium for which the designation *Pseudomonas mephitica* is suggested. The causative organism is an actively mobile, grain-negative rod occurring singly or in pairs and chains, which produces neither gas nor spores, grows at relatively low temperatures (5 deg. C.) over the pH range used in butter making (5.0–7.5) and is easily destroyed by heat.

The off odor, sometimes comparable to decomposing cabbage, developed in unsalted butter in 2 days at 21 deg. C. or in 6 days at 5 deg. C. Salt tends to inhibit its formation, but is not completely effective, unless thoroughly worked into the butter. Both in salted and unsalted butter the defect is least conspicuous at the lowest pH (highest acidity).

Similar odors, reported by Southwestern creameries, are attributed to certain feeds.

An infection would be of commercial significance when this organism would be present in larger numbers in the pasteurized cream, the wash water or the butter itself. Due to its low thermal resistance, however, its development can be prevented easily by proper pasteurization and sanitary methods in the plant.

Digest from "A Skunk-like Odor of Bacterial Origin in Butter," by T. J. Clayton and B. W. Hammer. *Journal of Bacteriology*, **37**, 251, 1939.

Acid Plasticizer For Cheese

FLAVOR similar to that of natural cheese, improved keeping qualities, increased stability of the olein and casein emulsion and improved blending properties result from the use of a dibasic acid salt as an emulsifying agent in the making of packaged cheeses according to the method disclosed in U. S. Patent No. 2,148,593. Diammonium citrate is specifically cited as giving these results in contrast to those obtained by the alkaline and neutral salts generally used. For most purposes, $1\frac{3}{4}$ per cent of the cheese weight

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DuPont EDIBLE LACTIC ACID ★

★ Edible lactic acid is steadily finding increased use in widely diversified lines of food and beverage products. Some of these are bread, beer, soft drinks, olives, yeast and pickles. ★ A few of the advantages of using edible lactic acid are improvement in taste, flavor and odor, controlled acidity and better food preservation. ★ Investigate the possibilities offered by DU PONT EDIBLE LACTIC ACID. A trial will convince you.

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is the recommended quantity. If a cheese of increased body is desired for summer marketing, one-half that quantity (0.875 per cent of cheese weight) mixed with an equal quantity of sodium caseinate is used. The patent is assigned to Henry H. Doering, Chicago, Ill., by the patentees, George L. and W. Kedzie Teller.

Fluid Milk Preservation

FLASH PASTEURIZING, as performed in the pasteurizer made by the Aluminum Plant Vessel Co., does not change the acidity of milk nor the composition of the dry extract. It does not change the odor, excepting that a slight turnip odor is lost if present. After being flash pasteurized at 82 deg. C. (180 deg. F.) the milk gave a negative test for peroxidases.

Raw milk can be kept as long as four weeks under 8 atmospheres oxygen pressure at 8 deg. C. (46 deg. F.), or three weeks under 3 atmospheres oxygen pressure. At ordinary temperatures, oxygen pressure permits milk to be kept two or three days longer than otherwise. Hydrogen peroxide can be detected in milk thus kept, but the action of rennet on the milk is not affected. Rising of cream, however, is greatly lessened by oxygen storage.

Digest from "Technical Means for the Treatment and Handling of Milk," by O. Kurmann, *Lait*, 19, 652, 1939 (Published in France).

FATS AND OILS

Losses in Stored Margarine

WEEKLY TESTS of wrapped margarine in storage showed large differences in surface and interior moisture content after nine weeks. Double wrapping gave no significant difference as compared with single wrapping. The effect of storage and moisture loss on quality was mainly noticeable in a single package, the interior remaining fresh while the surface layer was stale or even rancid. Usually, the change at the surface was toward a soapy rather than a rancid flavor.

The tests show that storage for two months is not feasible and that the customary lapse of two or three weeks from manufacture to retail sale is sufficient to impose on margarine about the same limit of permissible moisture content as for butter, namely 20 per cent.

Digest from "Weight Losses in Stored Margarine," by A. Schloemer, *Zeitschrift für Untersuchung der Lebensmittel* 78, 138, 1939 (Published in Germany).

FISHERY PRODUCTS

Preservatives for Fish Products

TO IMPROVE keeping quality, it is desirable to subject fillets and other fish products to some preservative treatment prior to freezing. Possible use of chemical preservatives depends largely upon the food laws enforced in different countries.

In contrast to round fish (dressed) where immersion into preservative solutions (sodium hypochlorite, formaldehyde, boric acid, saltpeter or high concentrations of NaCl) prior to packing in ice or the application of sterilizing ices (containing hypochlorites, ozone or benzoic acid), or storage in carbon dioxide atmosphere, met with only slight success or even failure, chemical preservatives are more effective in fillets or similar products because of the more intimate contact afforded between the chemical and the putrefactive agent.

Fillets cut from fresh fish respond better to chemical treatment, probably because the contamination is more superficial than in old fillets in which the bacteria are more or less evenly distributed through the tissues.

Brines containing up to 2 per cent common salt have no appreciable effect in reducing bacterial contamination.

★ Cercon is an edible, tasteless wax suitable for coating food products requiring protection from the air.

It is supplied in six colors—Snowdrift, Lemon, Orange, Tangerine, Apricot, and Olive. It has an ASTM penetration of 50 with the 50 gram weight attached.

We will be very glad to send test samples to any interested company.

THE CONEWANGO REFINING CO.
WARREN, PENNSYLVANIA

Both boric and benzoic acid or their soluble sodium salts control the reddening or bacterial decomposition of split salted fish.

Experiments with fillets from fresh flounder and frozen halibut stored from 4 to 6 months at –12 deg. F. in 2 per cent salt solution to which different preservatives (sodium benzoate 1.0, 0.5, 0.1 per cent; benzoic acid, 0.1 per cent; potassium nitrite, 0.1, 0.05, 0.02 per cent; hydrogen peroxide, 0.1 per cent; chloroform, 0.7 per cent; boric acid, 0.1 per cent; hydrochloric acid, 0.07 per cent; sulphur dioxide, 0.1 per cent; para-hydroxy benzoic acid ethyl ester, 0.09 per cent) were added indicate that the inhibition of bacterial growth varies with different kinds of fish. Other factors, such as rate of diffusion, or salt concentration of the brine, also influence the activity of the preservative.

Nitrite in quite low concentrations (0.02 per cent) strongly inhibits the rate of spoilage in fillets. Hydrogen peroxide, hydrochloric acid, and boric acid in the concentrations employed were not particularly effective. Sulphur dioxide produced an extremely unpleasant odor and flavor in the treated fillets, probably due to a reaction with the fish oils. Chloroform was very effective and has the advantage that it evaporates on storage. Boric acid and parahydroxy benzoic acid ethyl ester prevented deterioration considerably, though neither was as effective as sodium benzoate or benzoic acid. When used in the same concentrations, benzoic acid was more active than sodium benzoate; the free acid, however, produced a slight roughening of the fillet surface. Since the differences are not very marked, and since benzoic acid is neutralized when it enters the fish muscle, the sodium salt is almost as effective as the acid itself. These experiments also show that many of the chemical preservatives are more efficient in reducing the number of viable bacteria on treated fresh fish fillets than is ultraviolet light.

Digest from "The Role of Preservatives in Enhancing the Keeping Quality of Fresh Fillets," by H. L. A. Tarr and R. A. Sunderland. *Progress Reports of Pacific Biological Station, Nanaimo, B. C. and Pacific Fisheries Experimental Station. Price Rupert, B. C.* No. 39, 13, 1939.

GRAIN PRODUCTS

Cereal Flour To Prevent Off-Flavors

CERTAIN CEREAL FLOURS are known to possess antioxidative properties which prevent frequent flavor defects due to oxidation in milk and other dairy products. Finely milled oat flour, whole oat flour, and corn flour improve the milk flavor to some extent, while wheat, both bleached and whole, barley, rye and rice flours possess but little antioxidative value in milk. Corn and whole oat flours impart a more pronounced flour taste. Hulls in oat flour eliminate it as a suitable ingredient for dairy products. No direct correlation exists between the solubility of the cereal flours and their antioxidative properties in milk.

Both corn and oat flours are effective in retarding oxidation flavor in ice creams. Mixes containing oat flour have a firmer body; but corn flour increases viscosity of mixes to an even greater extent. When finely milled oat flour, as an antioxidant, is added with the sugar before pasteurization, the whipping ability of the mix is lowered unless the gelatine content is reduced from 0.35 to 0.25 per cent, where 0.5 per cent of oat flour is used. Substitu-

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tion of corn flour for oat flour decreases the whipping ability, further reduces the overrun and increases the melting resistance of the ice creams.

Digest from "Cereal Flours as Antioxidants in Dairy Products," by W. S. Mueller and M. J. Mack, *Food Research* 4, 401, 1939.

Moldy Grain and Milling Products May Become Toxic

GRAIN and milling products that have become musty or moldy due to improper storage may become poisonous and endanger the health of men and animals. In one case, cited by a Hungarian investigtor, a child died after eating moldy baby cereal and in four other cases the death of animals could be traced to moldy feedstuffs. Detailed studies of moldy maize, that had caused the death of a number of geese, showed that the fungi are not injurious by themselves. However, they penetrate through the broken hull to the germ and destroy it. In the course of deteriorating the proteins and fats in the acrospire, toxins develop which are responsible for the harmful effects of the maize.

Micro-organisms on the surface of grain multiply extensively under moist storage conditions, rendering the grain musty. During milling, part of the micro-organisms are mixed with the flour where they remain latent until sufficient moisture again stimulates growth. Therefore, milling products made from moldy or musty grain spoil quickly.

Chemical changes accompany the spoilage. Acidity increases appreciably, due to the degradation of the carbohydrates and to a certain extent of the proteins. It is likely that grain enzymes participate in this transformation. Also the possibility exists of interchange of soluble substances diffusing through the hull which are absorbed by the micro-organisms and the products of microbial metabolisms penetrating into the kernel.

Digest from "Studies of the Harmful Changes in Grain and Milling Products Caused by Moist Storage," by O. Varga, presented at Sixth International Congress of Technology and Chemistry of Agricultural Industries, Budapest, 1939. [Proceedings: Vol. I, page 435]

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Exacting Tests Such As These Insure that Every HOWELL Motor Measures Up

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PRECISION BALANCE TEST — *vibrometer check-up with motor operating at full speed, assuring perfect balance of rotor assembly and bearings.*

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HOWELL ELECTRIC MOTORS COMPANY
HOWELL, MICHIGAN
Representatives In All Principal Cities

POULTRY

How to Prevent Pockmarking And Freezer Burn on Frozen Poultry

SURFACE DRYING during storage is the primary cause for "pockmarking" (light colored circular spots around the feather follicles) and "freezer burn" (discolored areas of irregular shape on the skin surface) on frozen poultry. The rate of moisture movement from the interior of the product to the surface is practically negligible; therefore, surface evaporation must be kept at a low level.

Using the period required for surface drying to affect appearance, the proportion of skin area discolored, and its moisture content, as criteria for the rate of drying, it was found that only humidities of 98 to 100 per cent maintain frozen poultry in satisfactory conditions at 7.5 and –7.5 deg. F. for 83 weeks. Humidities between 95 and 98 per cent protect the product for six to nine months, whereas spoilage occurs within two to three months when the humidity drops below 95 per cent. When the humidity is the same, surface drying has less severe effects at the lower temperature. Severely freezer-burned muscle tissue contains only 50 to 55 per cent moisture, compared with 72 per cent in normal tissues.

Sealing of the paper linings ordinarily used in poultry boxes improves keeping quality. But only sealed aluminum foil linings prevent surface markings over long periods of time. Sealed, moisture-resistant, but not impermeable, stocks such as heavy

waxed paper reduced surface drying as effectively as unsealed, impermeable foil liners.

Digest from "Surface Drying of Frozen Poultry During Storage," by W. H. Cook, *Food Research* **4**, 407, 1939.

MEAT PRODUCTS

Storing Beef and Pork

BEEF QUARTERS and half pigs were stored for periods ranging up to eighteen months at three temperatures: 16.5, 5 and –6 deg. F. At 16.5 deg. the fat becomes greasy and rancid within four or five months. After a year, the only discernible difference in meats stored at 5 and at –6 deg. is that the odor is better preserved at the lower temperature. Fat, even at the lower storage temperatures, should not be exposed to air currents for these accelerate the development of rancidity. Storage in an atmosphere of carbon dioxide at 16.5 deg. preserves the meats quite as well as storage at 5 deg. in still air.

Effects on quality of meats in storage were judged both by cooking tests and by chemical analysis. Changes in the content of peroxides, aldehydes and metyl ketones, and in acidity, were measured. These factors of chemical composition are related to flavor and other aspects of quality in the stored meats. For example, there appears to be a definite relation between the bacterial count of the meat at the beginning of the storage and the methyl ketone content at the end.

Digest from "Experiments on Keeping Quality of Beef and Pork Fats in Cold Storage," by Friedrich Kiermeier and Rudolph Heiss, *Zeitschrift für die gesamte Kälte-Industrie* **46**, 111, 1939 (Published in Germany).

STARCH

Gelatinization of Starches

STUDIES of starch gelatinization by chemical and physical methods have failed to reveal whether gelatinization proceeds by transition of the starch granules to a new phase, followed by water absorption and swelling, or whether water absorption must come first. The problem has been solved by X-ray examination, which confirms the idea that two stages are involved in the gelatinization process, but shows that some water must be absorbed before the phase transition can proceed.

The process by which puffed cereals are formed is also considerably clarified by X-ray examination. The sudden cooling of grains containing a small proportion of water imparts to grains thus puffed a typical structure which is readily recognizable. The X-ray spectrum is remarkably similar to that of bread crumb from which the water has been extracted with alcohol.

Digest from "Studies in the Physical Chemistry of Starch and Bread Making," by J. R. Katz and J. Seiberlich, *Zeitschrift für physikalische Chemie* **A183**, 146, 1938 (Published in Germany).

SUGAR

Octosan in Honey

IN COUNTRIES where sugar is taxed, the tax-free grade is commonly denatured with octosan, a highly acetylated sugar. One use for denatured sugar is as a fall bee feed, to increase the output of honey. This practice is not objectionable if not carried too far, but if bees are liberally fed with sugar containing octosan their honey becomes bitter.

Honey which has been "denatured" by feeding too much denatured sugar to bees can be definitely identified as such by testing it with sulphuric acid and alpha-naphthol, after extracting the sample with ether and dissolving the ether extract in alcohol. The amount of denaturant which has made its way into the honey can be measured by hydrolyzing with standard alkali and titrating with standard acid solution.

Digest from "Bee Honey Containing Octosan," by W. Paul, *Zeitschrift für Untersuchung der Lebensmittel* **78**, 30, 1939 (Published in Germany).

Sorghum Sirup and Its Troubles

FARM-MADE SORGO SIRUPS present a commercially important special case of the system sucrose: dextrose: levulose in an impure solution which also contains starch and its degradation products formed during open evaporation. This complicated system includes factors which tend toward jellying, and others which tend toward crystallization. These factors have been studied as an aid toward preventing such defects in the sirup.

It was found that jellying is related to the starch content of the sirup and increases as the sorgo stalks become more mature. Sirup from stalk tops has more starch than sirup from the butts. As the stalk grows older more of its parts yield sirup that jellies. Jellying and crystallization may occur in the same sirup.

There are two types of crystallization in sorgo sirup. In one the crystals are sucrose, in the other they are dextrose. With respect to influence on quality of the sirup, one is as important as the other. The relative proportions of sucrose and reducing sugars govern the crystallization, with sucrose crystallizing if its ratio to reducing sugars is 1.15 or higher, while dextrose crystallizes from the sirup if the ratio of reducing sugars to sucrose to 1.04 or higher. If it is desired to make crystallized sugar from sorgo, the stalks may be cut and parts selected to yield either sucrose or dextrose, as desired.

Digest from "Jellying and Crystallization of Sirups Made From Different Parts of the Sorgo Stalk at Different Stages of Maturity," by E. K. Ventre, S. Byall and C. F. Walton, Jr., *Journal of Agricultural Research* **59**, 139, 1939.

Molasses Byproduct

BY MIXING cane molasses with a sixth to a third of its weight of freshly burned lime, a hard solid is obtained which can be ground to a fine powder. The lime must be introduced slowly, in small portions with active stirring. The reaction is violent, with a rapid rise in temperature, and must be kept under control.

The product does not absorb water from the air and can be kept in bags in all weather. When mixed with water it forms a smooth paste which sets to a hard mass, useful in plastics and in road surfacing. Aside from these uses, the powder is a useful ingredient in mashes for industrial fermentations, and can be used as an aid in recovering cane sugar from juices or solutions.

Digest from "Utilization of Cane Molasses," by T. R. Bhaskaran, S. C. Pillai and V. Subrahmanyan, *Journal of the Indian Institute of Science* **22A**, 139, 1939 (Published in India).

MISCELLANEOUS

Fruit Juice for Heart Disease

FRUIT JUICES have found a valuable place in special diets for patients suffering from certain cardiac disorders in which salt must be nearly or entirely eliminated from the diet and the intake of protein and fat must be very low. Fruit juices are practically fat free and very low in protein content, their sugar content is mostly fructose (which is better for the patient than cane or beet sugar) and their mineral content is mostly potassium and calcium. They contain beneficial vitamins and cell building substances. Another advantage is that they promote a favorable alkalinity in the body.

In the diseased heart conditions, which call for this sharply restricted diet, fruit juice lessens the hardship felt by the patient. The usual quantity prescribed is from about a pint to a little less than a quart per day. Fresh, canned, or bottled juice may be used, depending on availability and price.

Digest from "Practical Experience in Fruit Juice Therapy for Cardiac Patients," by G. Moschinski, *Deutsche medizinische Wochenschrift* **65**, 1566, 1939 (Published in Germany).

Formulas for Foods

FORMULA NO. 42

Minced Luncheon Specialty No. 1

Bull meat	**35 lb.**
Boneless chucks	**35 lb.**
Regular pork trimming	**20 lb.**
Back fat (diced)	**10 lb.**
Dry milk solids	**3½ lb.**
White pepper	**6 oz.**
Cardamom	**2 oz.**
Nutmeg	**2 oz.**
Cinnamon	**2 oz.**
Onion powder	**½ oz.**
Salt	**3 lb.**
Quick cure (Formula No. 23)	**1 qt.**

Stuff in beef bungs or corresponding artificial casings. Smoke and cook.

See also General Directions (Formula No. 22).

Formula from Dry Milk Institute

FORMULA NO. 43

Minced Luncheon Specialty No. 2

Boneless chucks	**35 lb.**
Beef cheeks	**20 lb.**
Hog stomachs	**20 lb.**
Beef tripe	**10 lb.**
Pork trimmings	**15 lb.**
Dry milk solids	**3½ lb.**
White pepper	**6 oz.**
Cardamom	**2 oz.**
Nutmeg	**2 oz.**
Cinnamon	**2 oz.**
Onion powder	**½ oz.**
Salt	**3 lb.**
Quick cure (Formula No. 23)	**1 qt.**

Stuff in beef bungs or corresponding artificial casings. Smoke and cook.

See also General Directions (Formula No. 22).

Formula from Dry Milk Institute

FORMULA NO. 44

How To Use Dry Milk Solids

A. Always keep the barrels tightly covered and store in a cool, dry place.

B. In cooking any candy containing milk it should be carefully watched to avoid scorching. This is especially important when the moisture content of the mix is low.

C. Always stir the mix thoroughly, particularly when it reaches the boiling point. Scrapers in steam kettles must fit closely.

D. For most types of candy, the dry milk can be mixed with the sugar. This mixture is then made into a paste by addition of water and finally into a semi-liquid.

FORMULA NO. 45

Rich Basic Sweet Dough

Sugar	**12½ lb.**
Salt	**25 oz.**
Malt extract	**2½ lb.**
Shortening	**15 lb.**
Eggs	**7½ lb.**
Water	**41 lb.**
Dry milk solids	**10 lb.**
Flour	**77½ lb.**
Yeast	**5 lb.**

(See Formula 27 for directions.)

Formula from Dry Milk Institute

FORMULA NO. 46

Lean Basic Sweet Dough

Sugar	**10 lb.**
Salt	**15 oz.**
Malt extract	**2½ lb.**
Shortening	**10 lb.**
Mace	**2½ oz.**
Eggs	**5 lb.**
Water	**41 lb.**
Dry milk solids	**2½ lb.**
Flour (medium strength)	**95 lb.**
Yeast	**3¾ lb.**

(See Formula 27 for directions.)

Formula from Dry Milk Institute

FORMULA NO. 47

Frappe

These frappe preparations are used by candy manufacturers in the United States and throughout the world. Frappe can be quickly and economically produced in any factory equipped with an ordinary cooking kettle and marshmallow or icing beater.

We recommend the use of three different types of frappe, namely: frappe—No. 1; frappe—No. 2; and frappe—No. 3. The basic formula for all of these preparations is essentially the same, with the execption that the amounts of albumen and water to dissolve the albumen are increased in the frappe—No. 2 and frappe—No. 3.

Frappe may be stored for lengthy periods in any type of container that is free from rust.

Frappe—No. 1

50 lb.	**Corn sirup**
50 "	**Standardized invert sirup**
1 "	**Albumen—dissolved in**
2 "	**Cold water**

Frappe—No. 2

50 lb.	**Corn sirup**
50 "	**Standardized invert sirup**
2 "	**Albumen—dissolved in**
4 "	**Cold water**

Frappe—No. 3

50 lb.	**Corn sirup**
50 "	**Standardized invert sirup**
3 "	**Albumen—dissolved in**
6 "	**Cold water**

In each formula, boil the corn sirup to 245 deg. F. Shut off the heat and add the standardized invert sirup and stir until it is melted. Place the batch into a marshmallow beater, start the beater, then gradually add the albumen solution and beat the batch until light.

This formula was obtained from the Nulomoline Co., New York

FORMULA NO. 48

Coconut Custard Pie Filling

Sugar (sucrose, granulated)	**2 lb. 8 oz.**
Tapioca flour	**1½ oz.**
Salt	**½ oz.**

Place in mixing bowl and mix thoroughly.

Eggs, whole	**2 lb. 8 oz.**

Add eggs to dry ingredients and mix to a smooth paste.

Milk (fluid)	**8 lb.**
Vanilla extract	**1 oz.**

Add milk and flavor to the egg mixture and mix until sugar is thoroughly dissolved.

Coconut, shredded	**1 lb.**

Place 2 oz. of coconut in bottom of each pie shell before filling.

Total 14 lb. 3 oz.

This formula makes eight 9 in. pies.

Bake at 425 deg. F. for approximately 20 minutes.

WILL *YOUR* LABEL SATISFY HER?

SHE is typical of thousands of American Housewives who are beginning to adopt an added standard in judging food products and advertising claims for them.

She is going to require high vitamin value—and you will not be able to hold her interest with mere general statements. She is going to insist on specific declarations, so many units of vitamin B_1, so many of C—and she will know herself whether the amounts named are a meaningless gesture or worth while.

For Mrs. American Housewife is coming to know her vitamins, to realize for example that vitamin B_1 is required for growth and nerve stability, and influences appetite and carbohydrate metabolism; and that vitamin C maintains the intercellular cementing substance of connective tissues, is necessary for normal tooth structure and firm gums, for capillary resistance, and has an anti-infective influence. She knows that these two vitamins especially may be destroyed or lost in modern processing and cooking, that they now can be restored and that medical authorities and nutritional experts endorse vitamin restoration in foods.

Have your products been assayed for vitamins? Can they really be said to be "vitamin-rich"? Consult us without obligation, let us tell you how to *build up* vitamin potencies to meet these new requirements.

And if you already know the answers and expect to be buying crystalline synthetic vitamin B_1 (thiamin chloride) or vitamin C (ascorbic acid) over the coming months, let us show you how we are best equipped to be your exclusive source of supply. HOFFMANN-LA ROCHE, INC. • NUTLEY, N.J.

VITAMIN DIVISION

HOFFMANN-LA ROCHE, INC.

FAMOUS FOR PHARMACEUTICAL CHEMICALS

This is a sweeter custard filling than most of the conventional formulas now in use.

Place the 2 oz. of coconut in the bottom of each unbaked shell. Fill custard over this to top of the rimmed shell, and bake until the filling is slightly firm. Do not overbake.

Stir filling occasionally while filling into shells.

Some trade demands a slight nutmeg flavor in custard. Melted butter, 2 oz., may be added to the formula if desired.

Formula from General Foods Corp., New York.

FORMULA NO. 49

Coffee Sirup

Coffee	**6 lb.**
Water	**4 gal.**
Sugar (sucrose)	**25 lb.**
Benzoate of soda solution (see Formula No. 10)	**2 oz.**

Working Directions

Six pounds of finely ground coffee are mixed with one gallon of boiling hot water. This wet coffee is then put into a coffee bag such as is used in coffee urns. Into this is poured two gallons of boiling hot water and the dripping accumulated. When most of this water has seeped through the coffee, the other gallon of water is added; this also should be boiling hot. This procedure drives most of the color and flavor from the coffee.

To the liquid derived from the water dripping through the coffee add sugar and benzoate of soda solution. Stir.

Formula from David Algie.

FORMULA NO. 50

Tea Biscuit

Ingredients	Batch Weight 100 oz.	Batch Weight 100 lb.
Top quality special cake flour	**52 oz.**	**52 lb.**
Baking powder.	**3¼ oz.**	**3 lb. 4 oz.**

Blend by sifting. Place in machine bowl.

Sugar, fruit powdered	**6 oz.**	**6 lb.**
Butter	**3¼ oz.**	**3 lb. 4 oz.**
Hydrogenated shortening	**3¼ oz.**	**3 lb. 4 oz.**

Add these to the flour and rub together on low speed until formed into crumbs the size of peas. Then add:

Fluid milk	**31½ oz.**	**31 lb. 8 oz.**
Salt	**¾ oz.**	**12 oz.**

Have milk very cold. Dissolve, add and mix until smooth. Set machine on second speed and beat for 1 minute.

Bench Method

Place dough on lightly floured board, knead just a little and roll out to thickness of ½ in. Then cut into rounds.

Set on greased sheet pans, brush lightly with egg wash, milk or shortening, as preferred, and allow to rest only 5 to 10 minutes.

Bake quickly at 400 to 450 deg. F., depending on size.

Formula from "Bakers' Cakes Better Than The Housewife Can Bake!" (Copyrighted by Brown's Hungarian Corp., New York), by special permission.

FORMULA NO. 51

Canned Smoked Chum Salmon

Use fish weighing about 10 lb. Remove ribs but leave nape bone attached to facilitate handling sides. Brine the sides for 1 hour in 80 deg. Sal. brine. Smoke 3½ hours at 110 deg. F.

For smoking, use hemlock sawdust.

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48,692 Tons OF VILTER PAKICE BRIQUETTES at $1.29 Per Ton!

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Since then, a detailed survey of their Ice-making operations, made by an independent Engineering Firm, showed that Vilter PakIce and Briquettes have been produced at a cost of *$1.29 per ton.* And they've enjoyed BETTER Car Icing—at this saving!

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- Vilter PakIce Equipment is made in daily capacities of ½, 1, 2½, 5 and up to 30 tons in 5-ton increments. Briquette attachments available on units from 15 to 30 tons capacity.

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Water: Temperature ..... Cost .....
Power: Volts ..... Phase ..... Cycle .....
Cost per K.W.H. .....
Present Cost of Ice per ton .....
Name .....
Address .....
City ..... State .....

Place some juniper twigs under the sawdust (instead of other wood shavings) when laying fire. This adds materially to the flavor of the smoked sides.

Cut smoked sides into steaks 1¼ in. thick, place in 1 lb. oval cans, close and sterilize in the usual manner.

Formula from Pacific Fisheries Experimental Station, Progress Report No. 42, Naniamo, B. C.

FORMULA NO. 52

Chocolate Fudge Base

Bitter chocolate..... 30 lb.
Shortening..... 25 lb.
Vanilla concentrate (16X)..... 2½ oz.
Corn starch or cocoa.. 2 lb. 4 oz.

Melt slowly and stir smooth. Heat to 130 deg. F. and add:

Corn sirup, unmixed (glucose)..... 20 lb.

Formula from Parker-Broeg, Boston.

FORMULA NO. 53

Hot Cross Buns

Use basic sweet dough. (See Formula "27," "45" or "46.")

Add 10 lb. of a good fruit mixture for each 20 lb. of flour used. The fruit should be added just before the dough comes from the mixer; the mixing to continue just long enough to get the fruit well distributed.

After fermentation, scale the dough in pieces of desired weight, round up pieces into bun form, and set close together in bun pan.

Proof to twice original size. Cut crosses with sharp knife. Wash with an egg wash and finish proofing in steam box. Bake in a good heat (350 to 400 deg. F.).

After baking, fill the cross cuts with a vanilla icing or short dough topping.

FORMULA NO. 54

Smoked Turkey

Dress birds to remove heads, all feathers and offal from body portions, rinse thoroughly with cold water, and hang in cool place until fully chilled.

Remove wings and neck, and rub each bird inside and outside with 1 lb. of curing mixture consisting of 3 lb. common table salt, 8 oz. of nitrate of soda or Chile Saltpeter, and 12 oz. white granulated sugar thoroughly mixed.

Place bird in a container, stoneware preferred, and hold for about 24 hr. at approximately 38 deg. F.

Dissolve remainder of curing mixture in 2 gal. of boiling water, cool to 40 deg. F., pour over bird to cover, and let stand for approximately 7 days at about 38 deg. F.

At the end of curing period, remove bird from brine and soak in lukewarm water for 15 min. Wipe dry with clean cloth and let hang for 3 days at about 40 deg. F. when the turkey will be ready to smoke.

Split bird open, tie stout cord around legs and neck, expose to dense smoke from hardwood chips or sawdust (preferably hickory chips). Temperature in smoke house should be between 90 and 100 deg. F. and the time of smoking should be from 48 to 60 hr. depending upon design of smokehouse and degree of smoking desired. Strong drafts through smoke house should be avoided as they cause heavy shrinkage and drying out of the turkey meat.

After smoking, the bird should be hung at least for seven days (three weeks is preferred) for mellowing to develop a tender texture and a uniformly developed flavor throughout the bird.

Total shrinkage in weight on live bird basis is 50 per cent, (a 20-lb. live turkey will make only a 10-lb. smoked bird).

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Of cadmium-plated steel shells, with sintered, graphited liners, these new Sterling Drive Shaft Bearings retain the full tensile strength of the all-bronze bearing plus the added advantage of being lined with the best possible bearing material.
And because it is now "steel to steel" in Sterling Pumps, you no longer need to fear the galvanic action between bronze and steel at shaft-enclosing tube joints.
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CLOSE-UP of section cut away to show cadmium-plated steel bearing with sintered, graphited liners in place.
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Books

Salmon Fisheries Survey

NORTH PACIFIC FISHERIES. By Homer E. Gregory and Kathleen Barnes. Published by American Council Institute of Pacific Relations, 129 East 52nd St., New York, N. Y., 1939. 322 pages; 6¼x9¼ in.; cloth. Price, $3.

Those interested in protecting the extensive and valuable fisheries industries of the Pacific Northwest and Alaska will find in this work much significant information and data. The most comprehensive study of its kind, the book reveals what is happening to the food supply, the profits and the jobs afforded by the great fishing area extending from California to the Bering Sea. It also gives the facts about Japanese efforts to enter American fisheries. Other important factors are covered, including State and Federal policies, Canadian-American treaties, production, markets, foreign trade, labor conditions, industrial disputes, costs and profits. The world supply of canned salmon comes from the fish which spawn in the rivers flowing into the northern Pacific.

Help on Social Security

1939 SOCIAL SECURITY AMENDMENTS EXPLAINED. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York, N. Y. 18 pages; 6 x 9¼ in.; paper. Price, $0.50.

Presenting as it does in practical and convenient form the changes made in the social security law, this little book may answer some of the questions in the minds of industrial managers.

Labor Act in Simple Form

EMPLOYERS' DIGEST OF THE FAIR LABOR STANDARDS ACT OF 1938. Published by the Wage and Hour Division of the U. S. Department of Labor, Washington, D. C., 1939. 6 pages; 8 x 10 in. Free.

Every food manufacturer who comes under the Federal wage and hour laws should equip himself with a copy of this digest. It is a convenient guide to the employer's responsibilities under the Fair Labor Standards Act of 1938.

Leather Belt Data Book

AUTOMATIC TENSION CONTROL SHORT CENTER PIVOTED-MOTOR LEATHER BELT DRIVES. Published by American Leather Belting Association, 100 Gold St., New York, N. Y., 1939. 65 pages; 8½x11 in.; paper. Free.

Which is the more efficient and economical as a short drive for plant machinery, the V-belt or the flat leather belt, the latter used with a pivoted motor to control the tension? Important practical data on this problem are presented in this booklet through the cooperation of 46 manufacturers of leather belting and supplies. The real function of the book, however, is to provide data which will enable the plant man to select and price short-center leather-belt drives as quickly as he can V-belt drives. The publication is, in fact, modeled after the standard V-belt drive data books and serves the same purpose. Food engineers and plant superintendents will find it valuable.

Patents

Starch-Factory Byproducts Converted Into Carbohydrate Fatty Acid Esters—Sidney Mark Cantor, Riverside, Ill., to Corn Products Refining Co., New York, N. Y. Reissue No. 21,291. Dec. 12, 1939.

Composite Frozen Confection Having Lollipop Form Made to Consist of a Fruit Conserve Shell Filled With a Frozen Whip Mixture and Coated With a Covering That Will Remain Hard at Normal Room Temperatures—Abraham H. Bayer, Schenectady, N. Y., to Joe Lowe Corp., New York, N. Y. No. 2,182,784. Dec. 12, 1939.

Fruit Concentrate Consisting of Fruit Pulp in Colloidal State and Having 40 Per Cent of Its Sucrose Content Inverted—Norman M. Thomas, Brooklyn, N. Y., to Joe Lowe Corp., New York, N. Y. No. 2,182,829. Dec. 12, 1939.

Hams, Pork Shoulders and the Like Freed From Bone, Compressed to Predetermined Shape, Smoked, and Again Compressed While Hot to Give Unit of Uniform Cross Section and Desired Compactness—Karl C. Eikel, Chicago, Ill., to Armour & Co. No. 2,182,891. Dec. 12, 1939.

Fresh Citrus Fruit Intensified in Color by Treating With SO_2, Washing With Alkaline Compound to Lower Acidity of Fruit Surface, and Treating With an Aldehyde Material Which Reacts With Products Formed on Surface of Fruit During Previous Treatment With Sulphur and Alkali—John P. Ioannu, Philadelphia, Pa. No. 2,182,965. Dec. 12, 1939.

Chocolate Coated Confection Mechanically Brushed to Impart a High Gloss—Oscar E. Segrin, Hamilton Square, N. J. No. 2,183,033. Dec. 12, 1939.

Cheese Whey Pasteurized and Fermented With a Pure Culture Yeast to Convert About 65 Per Cent of Lactose Content Into Ethyl Alcohol in Not More Than 3 Days—Willem Kauffmann and Pieter Johannis van der Lee, Amsterdam, Netherlands. No. 2,183,141. Dec. 12, 1939.

Salt Protected Against Hardening or Caking by Addition of 1/50 of 1 Per Cent to 5 Per Cent by Weight of an Aqueous Solution of Sorbitol—Marnell Segura, Jefferson Island, La., to Jefferson Island Salt Mining Co., Louisville, Ky. No. 2,183,173. Dec. 12, 1939.

Vegetables Graded to Size by Mechanical Means—William J. Zink, Birmingham, Ala., to Mathews Conveyor Co., Ellwood City, Pa. No. 2,183,233. Dec. 12, 1939.

Dried Egg Meats Reconstituted by Addition of Water in Proportion Normally Found in Fresh Eggs Along With a Surface Active Agent Followed by Whipping of Mixture—Leon D. Mink, to Industrial Patents Corp., Chicago, Ill. No. 2,183,515. Dec. 12, 1939.

Egg Meats Prepared for Drying by Addition of Surface Active Agent to Aid Reconstituting—Leon D. Mink, to Industrial Patents Corp., Chicago, Ill. No. 2,183,516. Dec. 12, 1939.

Yeast Grown by Method Involving Addition of Nutrients in Three Steps With an Increased Rate of Aeration During Each Succeeding Period of Adding Nutrients—Robert Roy Irvin and Morris W. Mead, Jr., Bloomfield, N. J. No. 2,183,570. Dec. 19, 1939.

Emulsions and Suspensions of Dairy Products Stabilized by Soluble Gums Extracted From Irish Moss and Put Into Sweetened, Deodorized, Deflavorized, and Decolorized Sirup Form—Daniel V. Wadsworth and Leonard Wickenden, Manhasset, N. Y., to John J. Naugle, New York, N. Y. No. 2,183,597. Dec. 19, 1939.

Foods to be Frozen Pressed Into Frames Having Relatively Movable Sections and Held in Desired Manner During Freezing—Mikail T. Zarotschenzeff, New York, N. Y., to Z. Pack Corp., Jersey City, N. J. No. 2,183,732. Dec. 19, 1939.

Foods Inspected For Internal Structure by Use of X-ray Emanations—James M. Hait, Los Angeles, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,183,884. Dec. 19, 1939.

Antirachitic Properties Imparted to Foods by Controlled Ozone Treatment—James Knox Elderkin, Montclair and Emil Hoffman, Newark, N. J., to Chemical Products Co. of New Jersey, Inc. No. 2,183,933. Dec. 19, 1939.

Fruits Surface Treated With a Mineral Oil Compound Containing Approximately 4½ Parts by Weight of Acidulated Animal Fat and 25 Parts by Weight of Acidulated Vegetable Fat Heat-Treated to Form a Vegetable Oil-Meneral Oil Product—William W. Bennett, Alhambra, Calif. No. 2,183,981. Dec. 19, 1939.

Warmed Skimmed Milk in Atomized Spray State Mixed With a Mineral Acid in an Atomized Spray State to Accomplish Curd Precipitation as Step in Casein Recovery—Lawrence C. Pagel, Madison, Wis. No. 2,184,002. Dec. 19, 1939.

Citrus Fruits Heightened in Coloring by Treatment With an Aqueous Soap Dispersion Containing Xylene Azo Beta Naphthol Having Less Than 30 Per Cent of the Meta Isomer—Kenneth H. Klipstein, New Vernon, N. J., to American Cyanamid Co., New York, N. Y. No. 2,184,237. Dec. 19, 1939.

Finely Ground Vegetables Thoroughly Cleaned and Freed From Extraneous Water Subjected to 160 Deg. F. With Agitation to Drive Off Air and Undesirable Volatiles, Preliminary to Sealing in Air-Tight and Air-Free Containers as Means of Preserving Chlorophyll-, Carotin-, or Erythrophyll-Colored Constituents During Sterilization—Donald T. Wiltse, Great Neck, N. Y. No. 2,184,246. Dec. 19, 1939.

Vegetables Such as Lettuce Mechanically Grouped According to Predetermined Shapes and Size, Wrapped and Compressed Tightly Together for Crating—Wesley Dodge, Oakland, Calif., to Paterson Pacific Parchment Co., San Francisco, Calif. No. 2,184,290. Dec. 26, 1939.

Soft-Centered Confections Filled by Mechanical Means—Hermann Thürlings, Viersen, Germany, to Baker Perkins Co., Inc., Saginaw, Mich. No. 2,184,405. Dec. 26, 1939.

Sugar Juices Adjusted to Optimum pH Within Isoelectric Zone of Colloidal Impurities to be Removed by Addition of Alkaline Earths, Sulphur Dioxide or Equivalent Acid Reagent and Lime to Give Juice of Desired Alkalinity for Purification by Flocculation—Dario Teatini, Hougaerde, Belgium. No. 2,184,570. Dec. 26, 1939.

Starch Solids of Various Particle Sizes Removed by Rotary Screen Drum—George Jahn, Arnswalde, Germany. No. 2,184,598. Dec. 26, 1939.

Vitamin B and G Concentrate Prepared From Yeast by a Method Using Temperatures Not to Exceed 75 to 80 Deg. C.—Robert F. Light, Mount Vernon and Charles N. Frey, Scarsdale, N. Y., to Standard Brands Inc., New York, N. Y. No. 2,184,748. Dec. 26, 1939.

Foods Frozen by Making Tangent Contact With Refrigerant Discharged to Form a Continuous Film or Sheet—Chester J. Conn, Suffolk County, N. Y. Nos. 2,184,954 and 2,184,990. Dec. 26, 1939.

Cereals Legumes, and Vegetables Given Quick-Cooking Properties by Short Dry-Heat Treatment and Subsequent Treatment With Mixture of Metallic Salts—Logan A. Dils, Stuttgart, Ark.; 9/20 to Robert M. Foster, Helena, Ark., ½ to H. S. Cramer, New York, N. Y., and 1/20 to Douglas McCabe, Chicago, Ill. No. 2,185,053. Dec. 26, 1939.

Ready-to-Eat Cereal Products Made by Subjecting Cereal Grains to a Short Dry-Heat Treatment, Soaking in Water to Effect Swelling and Bursting of Grain, and Heating to Reduce Moisture to 3 to 8 Per Cent Preliminary to Treating With Mixture of Metallic Salts and Toasting—Logan A. Dils, Stuttgart, Ark.; 9/20 to Robert M. Foster, Helena, Ark., ½ to H. S. Cramer, New York, N. Y., and 1/20 to Douglas McCabe, Chicago, Ill. No. 2,185,054. Dec. 26, 1939.

Jellies and Conserves Made From Fruit Juices and Sugar Removing Water From Mixture and Inverting Major Portion of Sugar Content at Temperature Below Boiling Point of Solution in Separate Operations—Gustave T. Reich, to Pennsylvania Sugar Co., Philadelphia, Pa. No. 2,185,064. Dec. 26, 1939.

Potatoes and Similar Root Crops Dehydrated by Grinding Finely, Forming Plurality of Layers Between Whose Surfaces is Layered Ground Edible Absorbent Material in Quantities 5 to 7 Per cent by Weight and Pressing Composite Layers to Remove Water—Karl Maus, Berlin, Germany. No. 2,185,120. Dec. 26, 1939.

Dextrinized Bread Improving Starch Composition Made From Dried Potatoes—William Spencer Bowen, Westfield, N. J. No. 2,185,368. Jan. 2, 1940.

Potatoes Cooked on an Industrial Scale by Hot Water Flowing in a Continuous Manner to Give Uniformity of Cook—Orville Gano, Burley, Idaho, to Potato Corp. of Idaho, Garwood, N. J. No. 2,185,372. Jan. 2, 1940.

Toasted Milk Solids-Potato Product Made to Contain From 50 to 85 Per Cent Potato Solids From 5 to 48 Per Cent Skimmed Milk Solids, and From 2 to 10 Per Cent Salt—Byron H. Webb, Washington, D. C., to People of the United States. No. 2,185,451. Jan. 2, 1940.

Salad Dressing Made by Method Wetting All Dry Ingredients Except Paprika With Salad Oil As Preliminary Step—Dean C. Ingraham, Kensington Park, and Wing Wong, Berkeley, Calif., to The Glidden Co., Cleveland, Ohio. No. 2,185,465. Jan. 2, 1940.

Self-Sealing Wrapper—William Nial MacDonald, Detroit, Mich., to George T. Trumbull, Detroit, Mich. No. 2,185,469. Jan. 2, 1940.

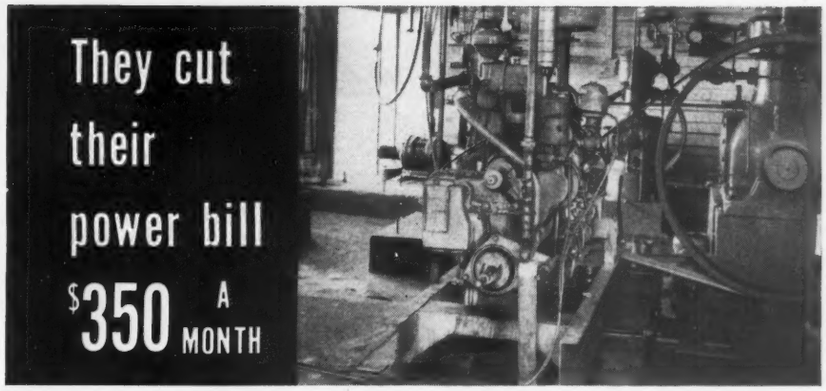
Bread Packaged in Self-Sealing Wrapper—William N. MacDonald and Walter Noble, Detroit, Mich. No. 2,185,470. Jan. 2, 1940.

Pectin-Containing Material Protected Against Deterioration by Adding 1 to 4 Per Cent Glycerine—Philip Bliss Myers, Scarsdale, N. Y., and William W. Cowgill, Fairfield, Conn., to Sardik Inc., Jersey City, N. J. No. 2,185,472. Jan. 2, 1940.

Fat Soluble Phosphatide Made by Reaction Between Fatty Carboxylic Acids of Animal and Vegetable Oils, Fats, and Waxes and Phosphorous Pentoxide—Stroud Jordan, Brooklyn, N. Y. No. 2,185,592. Jan. 2, 1940.

Pectin Layered Between Two Metal Foils Binds Them Together and Makes Them Substantially Non-porous and Gas Tight—Gustav Ruoff, Cologne, Germany, to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,185,649. Jan. 2, 1940.

Natural Green Colors of Vegetables Stabilized During Canning and Storage by Adjusting Alkalinity of Brine With Mixture of Magnesium and Calcium Hydroxides—James S. Blair, Maywood, Ill., to American Can Co., New York, N. Y. No. 2,186,003. Jan. 9, 1940.



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